
ORIGINAL ARTICLE

Student and new graduate perception of hospital versus institutional clinic for clinical educational experience

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Objective: To explore final-year students and new graduates from 2 North American chiropractic colleges regarding perceptions of the clinical educational experience in a hospital vs the institutional clinical setting.

Methods: A qualitative exploratory descriptive design was used for this research. Students and new graduates were invited to participate from a United States and Canadian chiropractic college. Semistructured interviews were conducted with 49 students and 14 new graduates lasting 60 minutes. Content analysis of the transcribed interviews was undertaken.

Results: The data identified that there were advantages and disadvantages to having clinical education in both settings. For instance, the hospital setting had a more varied patient case mix (making it more complex and challenging for their clinical skills development), the pace was faster, and there was more evidence-based practice. This compared to the college clinics, which tended to be slower paced and had less variation, students were required to build a patient base, and patient demographics resembled that expected in private practice. Each environment was considered a unique clinical learning experience.

Conclusion: Access and opportunity in both clinical environments is considered optimal in regards to providing a broad and varied student clinical experience. Exclusivity to one may not provide the best preparation for the professional context. As most graduate opportunities are private practice, the institutional clinical environment will provide a sufficient clinical teaching and learning environment to support the professional needs. A combination of these environments is considered ideal for the graduate.

Key Indexing Terms: Chiropractic; Competence; Education; Hospital; Interprofessional Relations

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INTRODUCTION

Traditionally, the mainstay of all chiropractic programs is the college-based clinics, where other students and the general public attend for chiropractic management. These clinics are owned and operated by the chiropractic institution and may be on or off campus and may be uni- to multidisciplinary.^{1–3} The institution maintains the governance, financial, and legal responsibility of the facility and operations of these clinics.⁴ There are a number of issues that have been identified with these institutional clinics. For instance, there exists a limitation of the number of real patients seen by chiropractic students, with a limited case mix within these institution-based clinics.² In addition, this patient experience is not always reflective of that expected postgraduation.² There is a void in how chiropractic graduates develop a meaningful clinical experience with real patients in real-life situations as other allied health

and medical education includes an abundant exposure to clinical environments, such as hospitals, to develop top-quality professions.³ One recent study at a North American chiropractic college found that new patients seen at their teaching clinics appear to be dissimilar to those of US practicing chiropractors in several important demographics, characteristics, and types of complaints. There tended to be fewer comorbidities in such, as the new patients had lower levels of overweight, obesity, and hypertension compared to US reference standards.⁵ They concluded that, “Continued efforts and monitoring of patient demographics are needed to provide interns adequate diversity of experience to ensure that they are well prepared for practice.⁵”

It is suggested that chiropractic education still remains behind other health professions, particularly in the area of clinical exposure of students to a variety of clinical situations.^{2,3} A diverse and varied exposure of clinical facilities with rotations are considered important for

enhancing the student's exposure to different patient populations, demographics, clinical presentations, and complex patients.^{2,6,7} Different types of teaching clinics may facilitate greater diversity in the patient population seen by chiropractic students, broadening the clinical training of chiropractic students by providing diversity in clinical settings and patient populations.⁶ One way that this can be achieved is through the provision of a variety of clinical venues for students. There has been a movement in chiropractic institutions, therefore, away from institution-only clinical experience for chiropractic students endeavoring to provide a more varied clinical program with a range of clinical settings. Humphreys and Peterson⁸ state that one of the strengths of the Swiss chiropractic program is that it provides early and continued contact with a wide variety of patients in the 2 different types of clinical settings: the hospital and ambulatory clinical settings. This type of patient contact has been a deficiency of other chiropractic programs.⁸ From the South African perspective, there is critique of the quality of chiropractic clinical education and clinical programs related to the student exposure to patient case mix:

Do the variety and severity of conditions seen by chiropractic students in their 1 year of clinical experience, reasonably compare with what they can expect to encounter in private practice?⁹

Chiropractic colleges, by and large, do not have the vast reservoir of patients and other resources that are traditionally found in hospitals and clinics.⁹ It has been suggested that a public hospital or clinic would most likely also be a source of patients with a greater variety of pathologies and psychosocial circumstances than what is found in a chiropractic teaching clinic, and therefore sessions in a hospital setting could significantly expand the future chiropractors' clinical preparedness.⁹ It is considered vital that learners engage with a large volume and variety of patients who exhibit conditions that represent the full spectrum of potential diagnoses that are considered by chiropractors.²

However, the presence of chiropractic within the hospital setting is a relatively recent initiative.¹⁰ Usually with the hospital-based setting, there may be an affiliation and agreement between the institution and facility, with the hospital maintaining the governance and responsibility of the facility. During the clinical experience, student supervision may be the responsibility of the chiropractic or hospital institution, depending on the contractual arrangement.

However, for most chiropractic programs, these clinical arrangements with hospitals are currently offered only to a minority of students.² Generally, there remains very little hospital access for chiropractic students.¹¹ However, there are 2 examples of chiropractic education institutions in North America that currently rotate their students to various hospitals for clinical education experience. This includes 1 chiropractic college in the United States and

another in Canada. Both of these institutions are similar in that they provide institution-based clinics, community-sector clinics, and hospital-based clinics as a part of their clinical program for their students.

While there have been a number of opinions and commentaries as to the need for hospital access for students as a part of their clinical education,^{2,3,8,9,11-13} there has been little explored from the student and new graduate perspective as to the value and perceptions of having a clinical program and clinical experience within the hospital setting. There has been considerable criticism and concerns expressed as to the access to patients provided to chiropractic students in the traditional institution-based clinic^{2,3,5,6,8,9,14,15} as well as the overall quality of clinical experience provided by these clinical settings by chiropractic academics.^{2,3,6,8,9} Similarly, there is limited exploration as to the student and new graduate perception of these clinical experiences provided at the institution-based clinic. The aim of this study was to explore final-year students and new graduates from these 2 North American chiropractic colleges regarding their perceptions of the clinical educational experience. This article presents only a portion of the overall data that discusses the hospital vs the institutional clinical setting.

METHODS

A qualitative exploratory descriptive design was used for this research. Qualitative-based research approach was considered an appropriate methodology for this type of study when there is little known about the phenomena.^{16,17} Full ethics approval for this study was obtained from RMIT University Human Research Ethics Committee as well as the independent review boards of the 2 North American chiropractic colleges. The questions used for this research were developed from the literature review, reviewed through an expert panel, and piloted with a cohort of new graduates for validity.

Study participants recruited included students who had 12 to 18 months to complete in their education and new graduates within 3 years of graduation. Recruitment was through an email communication sent by administrative assistants or alumni relations of each institution. Pamphlets of the study were also placed for the students in the clinical facility. Interested participants then responded via email regarding their expression of interest and arranged a time for an interview, which was a face-to-face focus group, interview, or phone interview. All participants were provided a plain-language statement and informed consent to be signed prior to engagement in their session. Recruitment of new graduates from the American program was challenging, requiring this to be conducted in 2 distinct periods initially in 2013 and then repeated in 2015. The 2-year period was to allow another cohort of graduates who may wish to engage in the study.

Semistructured interviews were conducted with a total of 26 students and 8 graduates from the United States and 23 students and 6 graduates from Canada. Semi-

structured interviews refer to the way the questions generate discussion pathways through participants in which the interviewer then brings the conversation back to the questions after having sufficiently explored a point. All interviews were audio recorded, lasting approximately 60 minutes. Participants were discouraged from identifying themselves or colleagues by name during the sessions. All interviews were professionally transcribed, checked with the recordings for accuracy, and then coded by both the researcher and the supervisor for reliability of analysis.¹⁸

Data analysis followed steps identified by Dey¹⁹ with content analysis as the chosen method for this study. According to Morse and Field,²⁰ content analysis occurs through reading the transcripts and identifying categories. This enabled the data to be categorized into themes.

RESULTS

Several themes emerged from the data, including the differences in perceptions of experiences from those students and new graduates who had engaged in an institution- and hospital-based clinical rotation. This article will only discuss this particular theme. Direct quotes from participants have been provided in order to support the findings. Those coded with NG are new graduate participants, and those with SS are students. The 2 institutions are identified by either US or C (for Canada).

While the line of inquiry was not to determine a difference in institution- vs hospital-based clinical experiences among participants, the themes emerged rather distinctly from the line of questioning. In regard to the institution-based clinical experiences, there were common themes from both institutions as to the strengths, weaknesses, and experiences in these environments. This article explores final-year students and new graduates from 2 North American chiropractic colleges regarding perceptions of the clinical educational experience in a hospital vs the institutional clinical setting with some direct comparisons made between the 2 types of clinical placements.

Institution-Based Clinical Experience

Both North American chiropractic colleges have their own clinic mostly on the main campus. It is these on campus health clinics where students of the program and employees tended to attend as patients. Members of the general public also had access to attend these clinics. As there were many students, the patient population tended to be aged in the earlier adult period. Presentations at this clinic included those with sporting injuries and acute injuries:

SS3557 P7 C: You see more normal cases here, more sports, more healthier cases, just 'cause most of them are students.

Advantages

Generally, participants commented that there were a number of advantages for the institutional clinic. For instance, the comment was made that on the whole

SS35556 P1 C: at the school where you probably deal with the more healthy patients.

Needless to say, from an educational viewpoint, caring only for such healthy patients at the beginning of the student learning journey is beneficial, as this enables scaffolding of learning. In addition, working in the institutional clinic would increase the students' confidence because

SS35556 P2 C: with ah, in terms of treatment, we are used to adjusting like interns or like first-year to third-year students, which are relatively healthy.

Another advantage identified from the data was that students only saw

NG25123 US: minor aches and pains I never really saw anything too complex while I was there working [institutional clinic].

Ultimately, the institutional clinic was viewed as an advantage because it resembled the type of environment and patient caseload as would be seen in private practice. In other words, because

SS35557 P6 C: my first rotation which was up at [on campus clinic], I felt the population was very similar to what I will see in the future.

This was supported by a new graduate who believed that being in the institutional clinic was an advantage as the case mix more likely resembled that of professional practice:

NG0043 US: I would say [institutional clinic] probably more so because it was more cut-and-dry cases of neck pain and lower back pain and things like that.

Disadvantages

Respondents appreciated the exposure to some of the acute presentations in the institutional clinic but felt that patient compliance was a frustration, as the patient was commonly student. The students would come in for a one-off treatment as opposed to following a treatment plan. The issue with students is that they tended not to abide by the prescribed treatment plan or attend their follow-up treatments as recommended.

However, this new graduate commented that there was more scope that needed to be explored with the institutional clinic to assist in learning:

NG0043 US: I would say [institutional clinic] slightly, but I don't think they let us dabble any, as much as we should have.

There was almost a sense from this quote that students were not able to be involved in the clinic as much as they could be. In addition, participants commented that learning was also impeded with the institutional clinic for another reason:

SS25125 P2 US: But staying at our hub thing [institutional clinic] and seeing the same people all the time wasn't helpful.

The institution-based clinics were perceived to be a less challenging environment as far as the students were concerned for a number of other reasons. This was based on the number of patient visits in these clinics:

SS35556 P2 US: I would say all the clinics are not that busy, we have 1 or 2 patients a day. Those are not very engaging.

One of the reasons identified from the data as to why this was seen as a disadvantage was that

NG0058 C: obviously the more hands you can get on people, with under supervision, I think would be better. That's one of the reasons why I wanted to do a downtown external clinic, they tend to be busier.

There were participants who speculated as to the reason why the institutional clinics were not busy because they were not well marketed and known to members of the public:

NG0058 C: I did a number of outreaches that year nearby, and some people didn't even know they [institutional clinic] were there. They had been there for 10 years.

As the institutional clinics saw mostly students, the experience was seen to be not as realistic:

SS 25126 P1 US: because you're just seeing other students who generally come in asymptomatic or come in with little kinks from sitting in class all day. So the real-life experience is kind of lacking.

The data identified another reason why the institutional clinics were not as challenging as they could be:

SS25125 P2 US: We don't see a variety of cases so I don't feel I'm going to be prepared when I go out into practice.

As can be identified in this quote, this particular student was concerned about one's clinical preparedness based on the case mix seen at the on-campus clinic.

Hospital-Based Clinical Experience

Both North American chiropractic colleges were able to place the chiropractic students into the hospital environment. For the students in Canada, this was a semester-long clinical placement at a hospital facility under direct supervision of a clinical supervisor employed by the chiropractic college. In contrast, students from the US college were allocated to a short-term clinical placement of several weeks in a hospital facility with a discipline-specific supervisor. The student's and new graduate's impression of the hospital experience was mainly positive and seen mostly as a strength of the clinical program.

Advantages

There were a number of reasons identified as to why the hospital experience was so positive. First, from a student and new graduate perspective,

SS35556 P1 C: you get more complex cases so, umm, and maybe more experience dealing with the comorbidities and things like that.

NG25123 US: Yes, when I went to the [named hospital clinic], that's when I started taking a varied and complex case mix I would say.

Participants identified the benefit that seeing complex cases had in increasing their confidence and sense of being better prepared. In other words,

SS25125 P1 US: after seeing a series of complex cases it's almost like, alright I can handle pretty much anything now. . . . Yeah, it's built up my confidence.

One of the other aspects of the hospital setting that contributed to the positive experience was the access to a high volume of patients. The effect that this high volume of patients had on the student is evident from this quote:

NG0053 C: It played a role in my clinical competence by mainly the volume of patients that I had seen.

The other reason identified from the data as to why the hospital clinical experience contributed to the developing competence of the students was

SS35556 P2 C: we come here, we get all sorts of patients who are essentially much harder to adjust. So you also have to get used to that, and really improve your skills quickly.

This variety of patients that the students had access to during the hospital clinical placement also contributed to this positive experience and to their learning:

NG0043 US: Just to be able to see conditions that I probably wouldn't never have seen in my whole practicing career. All in a few short months. Because of the wide array of injuries and things that the soldiers encounter.

The referral pattern of patients to the chiropractic clinic from other health professions within that setting seemed to assist in providing this varied patient cohort:

SS35557 P7 C: I think that maybe within the hospital setting you will just get referrals from within the hospital from a patient base that you may not see in another clinic that does not have that relationship with a hospital.

One of the other advantages of the patient complexity within the hospital setting was that this meant students were being exposed to patients who had biopsychosocial issues and learning how to deal with these. This allowed for another level of competency and preparedness of students:

SS35556 P4 C: Along the same lines I think my experience at [named hospital] has helped me with patients that I care for, being able to talk to a patient and know what to say in certain circumstances . . . like if your patient starts crying, or starts talking about something really emotional. Umm, I feel like in just my experience here with the number of patients and the clinician . . . is leading to a preparedness to deal with, you know, those situations better.

An interesting aspect of the hospital clinical experience was that participants felt that there was a greater expectation of professionalism required on their behalf during this clinical placement. In addition, as can be seen from this quote, the hospital clinical experience also helped them develop professionally:

NG25123 US: I would say that it kind of just threw me into the situation where I was like I knew from the beginning that I can't act like a kid I need to act like a grown up, a professional, and that was probably one of the greatest strengths and then also . . . dealing with complex cases and forcing you to critically think.

Needless to say, one certain feature that dominated the discussion among participants was that placement within

the hospital provided more access and opportunity for interprofessional education and learning:

SS35556 P2 C: The first 3 years we were taught how to communicate with other health professionals to sort of speak the same language as they do. And we are able to put that to practice especially here at [named hospital].

From this culture of patient care and professional collaboration in the hospital, it was hoped that others would also learn more about chiropractic:

NG0053 C: The value is to the patients, to tell their practitioners, the kind of care they are getting from us. And not just from the other practitioner but the students, the interprofessional, you know, student aspect of that where we are interacting with med students and psychology students so that when they graduate, they say "oh yeah, I know chiropractors, they do this, this and this, you know, why don't you see one!". . . they know about chiropractors and that they do this.

Disadvantages

However, there may be an unanticipated drawback from the students' access to the full clinical records that happens in the hospital setting:

NG0053 C: Ummm, you know I found I got a bit, for lack of a better word LAZY when I was doing my intakes at the hospital because I had all of the health information in front of me. . . . Whereas being in the, on your own, you have to really tease out the information.

One of the negative aspects of the hospital clinical environment identified in the data was that it may not resemble the private practice setting that most chiropractors will operate in as professionals. The way to source patients certainly did not reflect that of private practice. For instance, there was no need for marketing or building up a client base in the hospital setting, as there was an abundance and mostly a wait list of patients at these facilities:

SS35556 P1 C: Also unrealistic in the sense of umm not having to obtain referrals or having to obtain an abundant supply of patients. Not particularly at the [named hospital] location, where we don't get a lot of opportunity to umm build the practice or obtain referrals from the patients that we know.

In addition, there seemed to be a large number of patient presentations in the hospital setting that were not seen in the private practice setting. This participant also referred to the abundant information that is available in

the hospital file that is not necessarily available in a private practice scenario:

NG0053 C: Umm again a lot of complex chronic conditions and you know things I wouldn't see or I haven't seen often in practice . . . and the difference is that you actually have all the clinical information history in the patient file and the nerve conduction studies attached to make an accurate diagnosis umm so a lot of you know, yellow flags and psychosocial overlay onto the other conditions.

DISCUSSION

The results from this study highlight a number of advantages and disadvantages of clinical placements for chiropractic students in an institution-based clinical setting vs a hospital setting. Institutional clinics were identified as being slower paced, with more acute patient presentations as well as generally healthy patients presenting for care. However, fewer challenges were considered in this setting, with a less varied and less complex patient case mix, a less intense environment, and a sense of feeling less clinically prepared for the professional environment. Yet despite these disadvantages, the institution-based clinics were thought to be more reflective of professional practice. This compares to the hospital setting, which was considered faster paced and more clinically challenging with complex and diverse patients. Yet it was the hospital setting that was considered less like private practice.

Findings from this study also indicate that the patient case mix tended to be highly varied and more complex in the hospital vs the institutional setting, challenging the clinical skills of the students. Achievement of confidence and competence was, therefore, considered more within the hospital setting with the degree of patient complexity, the varied case mix, the intense pace, and the sense of feeling more prepared clinically. However, this development of confidence could have happened only after the students had received a good foundation of skills and knowledge from the institutional clinic first. In addition, the hospital required the student to be more efficient because of the complexity with a faster-paced environment that further contributed to this competence. Similar results were shown with chiropractic student placement in a South African hospital.⁹ The benefits identified were an exposure to patients with a wider variety of pathologies and psychosocial situations than could have been expected from an ordinary chiropractic teaching clinic.⁹ These students were also exposed to higher patient volumes and working in a higher-pressure environment. There was an increase in confidence demonstrated by these students from working in such an environment.⁹ One particular study identified that patients seen at a North American chiropractic teaching clinic were often younger with mild presenting complaints and not representative of those seen by chiropractic practitioners.¹⁴ Another chiropractic-specific study in New Zealand found that the college teaching clinic mix of patients is similar to studies in the United

States.¹⁵ A more recent Canadian Memorial Chiropractic College study stated that the case mix for students is akin to private practice, albeit they lack exposure to pediatric cases.²¹ The data were representative of patients seen across varied clinical facilities, such as the campus clinical facility and community and hospital clinical placements.^{13,21}

Hospitals across North America are becoming increasingly involved in offering complementary and alternative medicine services as a result of consumer demand, one of these being chiropractic.²² Clinical rotations of chiropractic students in the hospital setting are seen as a positive move.² This is because this may enhance students' exposure to a variation in patient demographic and presentation and rich learning environments as well as a more integrated, collaborative clinical environment.^{2,6,12,13,23} Hospital-based clinical opportunities are offered to medical and allied health professionals as a part of their clinical education, seen as essential to professional development.³

There appears to be value in both types of settings in the provision of clinical education. Starting in a slower and less intense clinical setting, such as the institution-based clinics, helps the student in one's clinical learning of procedures and developing competencies. Learning to undertake a thorough clinical assessment of patients, the initiation and engagement of patient management and hands-on care in a less pressure-oriented environment has value. This may assist in the student's clinical learning, yet it may not necessitate time management and developing efficiencies in their patient assessment and care when there is not the pressure of another patient waiting for an appointment.

The other advantage of students undertaking clinical in the institutional clinic is that there tends to be a focus on healthy individuals. It is an advantage for students to progress learning from normal to more complex cases, that is, scaffolding of clinical learning. This helps develop excellent foundational knowledge of what is healthy as well as of processes and procedures. As Benner²⁴ describes, this is part of the skills acquisition development that begins with the novice stage through to competent and expert stages. Nardone²⁵ further supports this progression as students move along the educational continuum as they progress from novice, advanced beginner, and competence levels as they acquire clinical experience with certain patient types and within certain settings.²⁵ A scaffolded approach is viewed as an advantage, as the students commence in a limited and intermediary clinical placement of peers, such as the institution and on-campus clinics, where they can learn more about procedures and aspects and then work toward the more challenged and charged environments, such as community and hospital settings, as they progress toward competence. This variety of experiences extends learning where students improved on their efficiencies, refined their assessment skills, and enforced the requirements for time management. Likewise, in the experiences of clinical learning for nurses, it has been found that the quality of their experiences was affected by

the variety of clinical opportunities to which they were exposed.²⁶

Similarly, the University of Zurich offers its chiropractic clinical program in a scaffolded learning environment, though somewhat differently.⁸ The successful completion of the 4th year of the program allows students to progress into institution and hospital clinical placements as “under-assistants” of which 7 hours of contact per week are required.⁸ Student then move into a clinical practice setting in their 5th year of the program engaged in patient care under direct supervision. In their final year, students undertake a combination of hospital clinical placement and chiropractic teaching clinic affiliated with the hospital. The authors note that this type of clinical program over many years with continued patient contact allows for integration of theory with practice.⁸

Similar results were found from a study comparing the competence of nursing students undertaking their clinical placement in a rural or metropolitan hospital.²⁷ The analysis of the data revealed that there were differences in competence and confidence, depending on the clinical placement. Those who engaged in the rural clinical placement reported greater competence, confidence, and organizational skills in comparison to those who had engaged in metropolitan placement. This was because rural hospitals tend to have more diverse patients compared to a metropolitan hospital. Yet rather than one vs the other, the authors suggested the importance of both types of placement for developing student competency.²⁷

One of the advantages of the institutional clinic identified from this study was the fact that the patient demographic of the institutional clinic more resembled that expected in private practice. All patients were referrals from the medical practitioners in the hospital. Consequently, students were not required to build a patient base in the hospital setting, in contrast to the institutional clinic. This was therefore a disadvantage of the hospital clinical placement.

One of the unintentional side advantages of having chiropractic students clinical within a hospital is that this exposes other practitioners and health professions to chiropractors, and this can extend their knowledge and awareness of what a chiropractor does.²⁸ Other practitioners being exposed to chiropractors extends their knowledge and awareness of what a chiropractor does and the legitimacy and effectiveness of chiropractic.²⁸ Other health professionals can see the validity in chiropractic in helping patients achieve wellness and therefore may be more likely to suggest this treatment, as they have seen that it helps people and is not all “wizardry.” Traditionally, hospital medical staff have considered the treatment offered by chiropractors to be of dubious value and not grounded on evidence-based research.²⁹ In addition, patients are being exposed to chiropractors, and this increases their awareness and usefulness of this practice regime.

Similarly, a study investigating the integration of a chiropractor as a team member in a community-based clinical setting was conducted in Ontario, Canada.³⁰ Of most interest was that the providers’ understanding of chiropractic changed over the course of the study period

from seeing it as a largely unknown practice to understanding both the science and the actual practice of chiropractic.³⁰ Additional benefits that were not anticipated included a change in caseload due to the additional treatment option that was provided with the presence of chiropractic. There appeared to have been a positive impact on the providers’ individual and group practice.³⁰ This is an unintentional advantage of having chiropractic students undertaking clinical in a hospital setting.

Overall, the importance of the quality of clinical placement experiences for students cannot be underestimated:

Chiropractic educational programs must ensure that their students will graduate with a core knowledge and a skill set that is sufficient for the chiropractor to perform the professional obligations of a primary contact health care professional. With regard to clinical internships, programs should be designed to enhance clinical experience by providing a diverse patient base that also is reflective of private clinical practice.²¹

CONCLUSION

This study aimed to explore final-year students and new graduates from 2 North American chiropractic colleges regarding their perceptions of the clinical educational experience in a hospital vs an institutional clinical setting. The results found that access and opportunity in both clinical environments is considered optimal in regard to providing a broad and varied student clinical experience. Exclusivity to one may not provide the best preparation for the professional context. As most graduate opportunities are private practice, the institutional clinical environment will provide a sufficient clinical teaching and learning environment to support the professional needs. A combination of these environments is considered ideal for the graduate. Further work needs to be undertaken to assess the feasibility of providing more clinical education to chiropractic students through both clinical placement environments.

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Concept development: NH, LJ. Design: NH, LJ. Supervision: LJ. Data collection/processing: NH, LJ. Analysis/interpretation: NH, LJ. Literature search: NH, LJ. Writing: NH, LJ. Critical review: LJ.

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