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The perceptions and experiences of chiropractic students on practicing evidence-based practice during their clinical practicum at a teaching clinic

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ABSTRACT

Objective: To determine the perceptions and experiences of chiropractic students on the implementation of evidence-based practice (EBP) during their clinical practicum at a teaching clinic in KwaZulu-Natal, South Africa.
Methods: A qualitative, exploratory, and descriptive design was utilized, interviewing 14 clinically active chiropractic master's students. Semi-structured interviews were conducted to obtain data, which were stored electronically and transcribed verbatim. Transcripts were then coded and analyzed into relevant themes and subthemes and thereafter interpreted.
Results: Four main themes were identified: (1) the perceptions and necessity regarding the roles of EBP, (2) undergraduate education and its role in the implementation of EBP, (3) the importance of clinical experience in the implementation of EBP, (4) implementation of EBP.
Conclusion: Students held positive perceptions regarding EBP and believed training at the institution provided a solid foundation. However, there is much to be done in the current chiropractic curriculum to increase the efficiency of the implementation of EBP given that a lack of training in multiple aspects was identified and the challenges faced could be forestalled by implementing the suggested measures of improvement.

Key Indexing Terms: Chiropractic; Education; Evidence-Based Practice; Clinical Experience

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INTRODUCTION

Evidence-based practice (EBP) integrates the best available research evidence in conjunction with clinical expertise with the consideration of patient values.[1] Thus, clinicians should be trained well enough to pose clinically relevant questions and access relevant literature to find, appraise, and use the best available evidence in routine clinical care.[2] Patients receiving evidence-based care have better outcomes in comparison to patients who do not.[3,4]

Globally, EBP is a basis of health care professional education; it was initially used in medicine, but now extends to the allied health professions.[2] It has been said that health care professions should effectively incorporate adequate knowledge, skills, and attitudes toward EBP into educational programs.[5] Implementing EBP is regarded as a key component for the improvement of health care quality.[6] Although numerous professions have implemented EBP, studies show that EBP can be difficult to implement in many professions.[7,8]

EBP has had an increasing impact on chiropractic education and its implementation in chiropractic care.[9] Suitable training in knowledge, attitudes, and skills are the foundation for the implementation of EBP, and its implementation in the curriculum is not a matter of choice for universities but rather a necessity.[2]

Students at the Durban University of Technology (DUT) Chiropractic Day Clinic (CDC) are required to use EBP when managing and treating patients during their clinical practicum by providing references for their desired treatment protocols. Thus, it is essential that they are knowledgeable in this regard and know how to use it adequately.

One survey has opined that evidence-based chiropractors should progressively increase the scientific credibility of the chiropractic profession among other medical professionals.[10] Despite having conclusive findings of favorable attitudes from chiropractors towards EBP,[11–13] the reasoning behind inadequate skill affecting overall utilization still remains, questioning

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whether challenges stem from a teaching level. There is a paucity in the literature regarding chiropractic student perspective toward the implementation of EBP, thus deeming the root of the challenges inconclusive. Therefore, the purpose of this study was to determine the perceptions and experiences of chiropractic students on the implementation of EBP during their clinical practicum at our teaching clinic in South Africa.

METHODS

Design, Sampling, and Data Collection

A qualitative, exploratory, and descriptive design was employed using homogenous purposive sampling. Eligible participants were 5th- and 6th-year chiropractic students who were clinically active for a minimum of 4 months. Potential participants were approached or contacted telephonically, and the procedure was explained to them verbally. A minimum number of 12 participants were required to be interviewed, and data were completed when data saturation had been reached. In total, 14 participants were interviewed, of which 8 were in their 5th year and 6 were in their 6th year of study. Interviews were conducted either at the DUT research room or online via Microsoft Teams (Microsoft Corp).

Interviews were conducted using a semi-structured interview guide that consisted of 3 key questions and relevant probes. The guide was developed by the researchers to suit the distinct structure at the DUT CDC. A pilot study was conducted with 1 5th-year and 1 6th-year student to determine if the questions were pertinent and clear. There were no recommended changes to carry out the main study. Demographic information was obtained from the participant verbally. The interview then commenced and was audio recorded.

Data Analysis

The audio recordings were transcribed verbatim and analyzed using Tesch's method of thematic analysis.[14] The 8 steps are as follows:

1. The researcher transcribed the audio-recorded interviews verbatim.
2. The researcher compared the transcribed data with the audio-recorded data with the use of field notes to confirm certain aspects of the data.
3. The researcher read and reread the transcriptions as many times as needed to fully understand and conceptualize the data.
4. The most informative interview was selected, and notes were made pertaining to that interview. This was repeated for the other interviews as well.
5. Similar topics were identified and clustered.
6. Themes were formulated from these topics.
7. An experienced person in qualitative research (in this case, the research supervisor) checked the data and transcriptions and confirmed the themes identified by the researcher.
8. Merging themes were identified and confirmed by the researcher and the supervisor supported by verbatim statements from the participants. The literature was reviewed to verify findings and draw a conclusion.

Table 1 - Participant Demographics

Participant	Age	Sex	Approximate Number of Months at the DUT CDC
1	25	Female	10
2	24	Male	10
3	23	Female	10
4	26	Male	20
5	22	Female	10
6	25	Male	10
7	24	Female	10
8	24	Male	10
9	22	Male	10
10	29	Female	20
11	33	Male	15
12	24	Female	20
13	28	Female	26
14	25	Male	16

Ethical Approvals

Permission to conduct this study was obtained from the institutional research and ethics committee (research ethics clearance number 201/21). Permission to access a class list to identify potential participants was obtained. Permission from the participants was a requirement for inclusion into the study. Participants were required to read a letter of information and sign the informed consent form before commencement of the interview. Participants were reassured that the data would be kept confidential and informed that the interview would be audio recorded. They were allowed to withdraw at any time if they felt uncomfortable. Their personal details were omitted, and they were allocated pseudonyms to ensure confidentiality.

Trustworthiness

Trustworthiness of qualitative research is established by using Lincoln and Guba's[15] 4 criteria: credibility, confirmability, dependability, and transferability. Credibility was ensured by issuing a letter of informed consent stating that participation was voluntary and participants could discontinue at any given time. Confirmability was elicited by asking the research supervisor to scrutinize the data through independent checking. Dependability was ensured by consistent questions being asked by the researcher during the interview and the supervisor double-checking the transcribed data. Transferability was ensured by providing a detailed description of the research context, settings, and processes utilized in the study.

RESULTS

Demographic data are shown in Table 1. Interview themes and subthemes are presented in Table 2 and discussed below along with single excerpts from participants to substantiate certain concepts.

Theme 1: Perceptions and Necessity Regarding the Roles of EBP

Participants expressed a strong belief in the necessity of EBP in general and its role in the chiropractic profession.

Table 2 - Interview Themes and Subthemes

Themes	Subthemes
1. Perceptions and necessity regarding the roles of EBP	1.1. Positive aspects regarding EBP 1.2. Negative aspects regarding EBP
2. Undergraduate education and its role in the implementation of EBP	2.1. Preclinical preparation 2.2. Theoretical training 2.3. Measures of improvement
3. The importance of clinical experience in the implementation of EBP	3.1. Clinical training 3.2. Support structures 3.3. Self-perceived limitations
4. The implementation of EBP	4.1. Theoretical implementation 4.2. Practical implementation 4.3. Challenges of implementation

However, 1 participant expressed the necessity of EBP alongside a disadvantage.

Positive Aspects Regarding EBP

Participants vocalized the necessity of EBP and the benefits of its role for the profession and individuals. Five participants implied that EBP provides credibility to the profession, and 1 participant believed that EBP enables the profession to move closer to mainstream medicine: "It's useful, based on the fact that we're trying to move more closer to mainstream medicine" (participant 9).

Alongside these positive beliefs, some participants expressed limitations in its implementation: ". . . you get confused with your what you think is evidence versus what the evidence actually says" (participant 1).

One participant supported the idea of EBP but believed that evidence should not only be limited to a journal but also patient experience by stating that ". . . evidence-based isn't always what's in a journal, but what's in someone's personal experience because that they have evidence through what they're seeing" (participant 7).

Negative Aspects Regarding EBP

One participant reported a disadvantage pertaining to the implementation of EBP and its role in the chiropractic profession:

> Coming from a profession that doesn't have a huge amount of literature behind it and a lot of financial gain behind doing chiropractic research, there isn't a lot of literature to support the treatments we would perceive to be effective. To say that you can't implement a treatment just because we haven't got studies to prove that treatment is effective can be a hinderance because we have anecdotal evidence, and people may report that certain treatments are very helpful for that condition but we don't have the literature that backs it up. In that regard, almost holding us back from producing the evidence that is required to prove that certain treatments are helpful for certain people. (participant 10)

Participant 10 believed chiropractic is a holistic profession compared with medicine. Contradictory to the opinion of participant 9, this participant believed that a holistic approach is what makes chiropractic exclusive to mainstream medicine:

> . . . you want to treat more holistically and less isolated, but evidence-based practice doesn't always suggest that. Medicine tries to isolate each area of the body so extensively and treat everything in a little box, which is exactly how they try to teach us not to treat because it's not effective. (participant 10)

Theme 2: Undergraduate Education and Its Role in the Implementation of EBP

Most participants had a theoretical understanding of EBP; however, they identified discrepancies between what was taught in the undergraduate program in comparison to what was expected during their clinical practicum. Some students were found to have a general idea of EBP and its importance; however, its implementation could be considered partially neglected.

Preclinical Preparation

Insufficiencies were reported by participants regarding their preclinical training, including a lack of sufficient training on critical appraisal of literature, implementation of EBP, the clinical environment, and practical learning due to SARS-CoV-2 pandemic restrictions: ". . . the struggle behind it is we never been taught how to critically be evidence-based . . ." (participant 6).

One participant reported sufficient training on the implementation of EBP, and another participant reported that training on the implementation is unnecessary.

Theoretical Training

All participants had an existing knowledge of what EBP was and how to search for literature. Six participants reported a disparity between what was taught versus what literature portrays, and a further 4 participants expressed the need for a reevaluation of the structure of subjects. Furthermore, 2 participants had a general idea of EBP, but its practice seemed inefficient:

> Information available isn't on manual therapy. If it is, often the results have been inconclusive, for example, adjustments are not more effective than mobilization. That makes it difficult to decide whether I'm doing treatment just because I've been told to for many years versus actually using evidence . . . (participant 1)

Measures of Improvement

Most participants expressed that the chiropractic training provided a solid foundation, whereas 2 participants expressed reservations. Measures of improvement were suggested to aid the implementation of EBP. Six participants suggested implementing a journal club much earlier, 5 participants suggested introducing evidence-based articles for treatments per condition, and 2 participants suggested implementing a workshop on EBP references prior to their clinical practicum. One participant suggested the need for more practical learning in the undergraduate program: ". . . the module where we had to learn how to critique journal articles. That's a skill that we should have potentially

learnt a lot sooner" (participant 1). "Things like that were unclear, and if we were told from an earlier onset, that would've been nice. Maybe like the workshop we had when we first started clinic. A lot of things weren't told to us" (participant 9).

Theme 3: The Importance of Clinical Experience and the Implementation of EBP

Participants expressed the necessity of clinical experience during their training and its role in implementing EBP. They also had positive and negative views regarding the support structures available during the clinical practicum. In addition, self-perceived limitations were reported.

Clinical Training

Participants spoke about their experiences regarding their clinical practicum as well as its impact on EBP and their clinical training. The necessity of the clinical experience at the DUT CDC, the necessity of the internship portfolio, and the importance of clinician interaction were reported.

Four participants found that the clinical experience had a positive impact on their confidence in treating patients. Two participants believed that the clinical experience would enhance proficiency in treatment of patients. One participant felt that exposure to different conditions encouraged further research and the desire to explore the available literature. Five participants emphasized the importance of clinician presence. Three participants reported the necessity of the internship portfolio for various reasons, such as enhanced understanding, more practical learning, and emphasizing important aspects: "With more experience in the clinic, we will be eventually prepared in private practice" (participant 9).

Support Structures

Participants were asked whether they felt that the DUT CDC had the necessary facilities and was equipped sufficiently for patient care. All participants believed that it had sufficient facilities and equipment. Four participants believed that it has more facilities than private practice. One participant believed that the CDC had much to offer, but reliance on equipment could become a problem given a case in which various treatment modalities may be unavailable once a student graduates and goes into private practice. Despite this belief, participants mentioned various aspects as to how the supporting structures in place at the clinic indirectly affected their desired treatment.

Self-Perceived Limitations

Participants reported various self-perceived limitations that serve as a hindrance in implementing EBP. One participant reported a lack of internet as a limitation. Two participants reported a lack of reading literature, 1 of which additionally reported difficulty referencing and a lack of proficiency.

Theme 4: Implementation of EBP

The participants identified theoretical and practical aspects that hindered their implementation of EBP as well as challenges encountered that affected their efficacy in the implementation thereof.

Theoretical Implementation

Participants were asked whether they felt more confident in their EBP capabilities as an aspiring chiropractor. Six participants felt confident in the treatment plans due to the presence of evidence, and 2 participants felt more confident in their own skills after reading literature encouraged by special areas of interest: "It gives you grounds to justify why you're doing what you're doing, which is always important that it's a lot easier to debate someone when you've got solid grounds to work off of as opposed to just subjective experiences" (participant 2).

Additionally, participants were asked whether their treatment responses were concurrent with applied EBP references at the DUT CDC. Six participants reported that most of their treatment responses were concurrent, and 3 participants reported variable outcomes. Furthermore, 6 participants reported that a general search for the purpose of referencing was done:

> There seems to be cherry-picking of evidence. Picking evidence that supports your bias is a lot easier than implementing the full realm of evidence available. I've had a good time doing extra research when a patient presents because I don't necessarily know enough to do more research and implement that at the first session. In terms of just using it for the references, I found them often cherry-picked just to get signatures. (participant 1)

Students identified a lack of literature in relation to various aspects, hindering their attempts to apply evidence-based references to their treatment outcome. One participant raised a concern regarding a lack of literature regarding treatment modalities that have been taught, and another reported a lack of literature regarding a simple chiropractic adjustment and the effect on the level of pain; however, this obliged the student to participate in further research to which the participant found a different treatment protocol that addressed the same pain. A further 2 participants reported a lack of literature regarding manual therapy such as chiropractic.

Practical Implementation

Participants reported difficulty pertaining to the practical implementation of EBP. Only 3 participants believed they were competent in implementing EBP but not as proficient as they should be.

A lack of supporting literature was reported by 5 participants, out of which 2 reported an occasional associated confusion with whether to implement the desired treatment protocol according to what was taught versus what evidence portrays: ". . . There's just a huge lack of literature in our field, and supporting the kind of treatment protocols we do, and so it does make it really difficult" (participant 10).

Challenges of Implementation

Participants encountered various challenges implementing EBP. Four participants expressed a disparity between clinicians' views versus students' views. Three participants reported clinicians' lack of engagement with articles. Five participants reported that SARS-CoV-2 pandemic restrictions impacted their desired treatment protocol, and 4 reported a

lack of updated literature. Four participants encountered difficulties in adapting evidence-based treatment protocols specifically to individual patients, and this translated into a theory–practice gap. Only 2 participants identified discrepancies between evidence and patient responses:

> I've had a couple of run-ins with clinicians where I've found solid evidence on how I should be using something, and they've said, "No. Do it this way." And that's been frustrating because I've gone through the effort of researching something to be told "no" by someone who hasn't bothered to read my article or bother to have a discussion about it because they, from, I assume, practical experience, feel they would treat this condition in this certain way, and they've had successful results, so therefore, I should as well. (participant 7)

One participant experienced challenges, such as paying for articles, and another reported that occasionally he forgot to find references for his treatments. Additionally, a participant reported that patient preference calls for an obligation to provide alternative treatments that evidence portrays as not being as effective as others. Furthermore, 1 participant reported a discrepancy between what was taught and evidence versus administrative protocols instituted by the DUT CDC, leading to difficulty in implementing EBP in its entirety due to the occasional changing of diagnoses to correlate with medical coding.

DISCUSSION

Theme 1: Perceptions and Necessity Regarding the Roles of EBP

Participants expressed that evidence serves as a guide on how to treat patients for various conditions, and this enhances the credibility of the profession as stated by Thomas et al.[8] Limited resources in the clinical setting and a discrepancy between what was perceived to be evidence what is evidence were limitations noted. Access to the internet and free online databases are fundamental enablers for the uptake of EBP in a clinical setting, whereas access to critical reviews of research articles was considered a moderately important tool.[16–18]

Reported downsides to EBP included the opinion of a lack of literature due to minimal financial gain on pursuing chiropractic research. Although there is a need for more in the literature in this regard, a claim of such nature cannot be fully substantiated. A statement made by Kawchuk[19] implies that there is a distortion of the base of evidence due to financial interests, and this needs to be studied along with its hidden biases in sponsored research. This affects the implementation of EBP because the lack of evidence for certain treatments can serve as a hindrance.

An important aspect highlighted is that chiropractic is believed to be a holistic profession, and to produce evidence-based literature, a method of isolating treatments is necessary, contradictory to chiropractic teaching. Tonelli[20] notioned that evidence-based medicine provides an inadequate account of optimal medical practice and a broader understanding of medical knowledge with reasoning is necessary. Tonelli and Callahan[21] pointed out that complementary alternative medicine approaches to care differ from that of professions within the reductionistic paradigm, and as such, the evidence at the time was linked to randomized controlled trials. Similarly, chiropractic patients are cared for as they present to a practice unlike in hospitals in which preparation takes place prior to patient admission. This brings about the discussion on whether standardizing chiropractic treatment alongside relevant intervention is a possibility[22] due to the variability in case presentation and the chosen method for treatment at that consult.

Theme 2: Undergraduate Education and Its Role in the Implementation of EBP

Similar to a study done by Bussières et al,[16] participants expressed a lack of sufficient training on critical appraisal of literature affecting the implementation of EBP. Another hindrance was a lack of practical learning due to SARS-CoV-2 pandemic restrictions by which students had reduced practical classes in comparison to prior years and the usage of certain treatment modalities were limited.

The findings of Malau-Aduli et al[23] and this study align in that a lack of preparation regarding aspects about the clinical environment was found. These included a lack of training on the use of equipment and EBP referencing and research as a whole, and this affected the implementation of EBP.

A void in the chiropractic curriculum was identified with regard to EBP teachings. This can be filled by implementing improvements akin to the findings of Haas et al,[4] who concluded that implementation of the new EBP curriculum in the 1st year of the undergraduate program was deemed a favorable outcome. This resulted in the chiropractic student's ability to acquire the knowledge necessary to find and interpret literature, retain and improve EBP skills over a period of time, and enhance self-reported skills in utilizing credible online resources.

There was consensus that the chiropractic training, in general, provided a solid foundation. To facilitate the implementation of EBP, a common suggestion of implementing a journal club much earlier was made, and this was a method used in the study done by Haas et al[4] with the outcomes deemed favorable.

Another common suggestion was to introduce evidence-based articles supportive of treatments per condition taught. However, it is imperative that pain classifications are understood with regard to musculoskeletal pain syndromes due to variable presentations,[24] signifying that conditions can present differently in each patient. A common expected standard between chiropractic regulatory authorities is that undergraduate institutions produce graduates who are capable of making decisions in the best interest of their patients[25–27] and being able to determine indications from contraindications.[26] A treatment per condition–based teaching method would limit the abilities of students regarding treatment options given the likely case of encountering a patient with relative contraindications for treatment. Therefore, implementing a teaching method as such could be considered impotent.

Although only 1 participant suggested more practical learning to improve the uptake of EBP, implying that an increase in confidence would amplify proficiency, this is congruent with the findings of Boysen et al[28] in which senior students reported an increase in clinical confidence relative to experience.

Students perceived that treating patients in a more realistic setting, frequent engagement with technical skills, performing clinical decision making, patient management, and communicating with patients and other health professionals as beneficial.

Theme 3: The Importance of Clinical Experience and the Implementation of EBP

The number and type of cases consulted by students in different clinical settings might be influential on the development of competencies.[29] In this study, students suggested that clinical experience aided in competency, and this boosted their confidence. Interaction with patients allowed for exposure to different medical conditions, encouraging more research that aided in the implementation of EBP. The fundamental activity that assisted in developing a sense of professional identity and preparing for a transition into practice was an exposure to patients.[30] This study found that the experience of fulfilling the requirements of the internship portfolio amplified practical skills and encouraged research. This is similar to a dominant theme in another study that all clinical experiences prepared students for their transition into practice, but clinical settings other than a university health clinic offered a higher level of preparation.[29] As well, Moore et al[30] identified that the exclusivity of only 1 type of clinical placement is unlikely to provide optimal preparation professionally.

Multiple studies[31–33] noted that, regardless of the clinical setting, students acknowledged the importance of having good clinical educators, concurrent with this study. Hence, it is crucial to maintain a certain standard of education, and the importance of the clinical practicum cannot be undervalued.

Aspects that indirectly affected the implementation of EBP included challenges regarding the rehabilitation room and excessive administration duties. The implementation of EBP involves more than applying the best literature to a patient. EBP implementation is also influenced by other factors, such as the environment, management structures, and resources.[34] There are numerous studies supporting the significance of assessing an institution in its context in order to understand how to best support the implementation of EBP.[33–37] Commonly these studies found that, in addition to an evidence-based protocol implemented at a managerial level, it is imperative to delve into the content, purpose, dynamic, and infrastructure these protocols hold and idealize these elements into context.

Vongsirinavarat et al[38] found that respondents considered themselves competent in practicing EBP, yet the frequency of searching and reading literature was relatively low. Similarly, 2 out of the 14 participants in this study reported insufficient reading of literature as a barrier. Only 1 of these 2 participants also reported difficulty referencing and a lack of proficiency that may suggest that these barriers are linked to differing levels of interest. However, findings from various studies[17,38,39] show that insufficient EBP training in the past has led to gaps in skills and application among health care professionals, reinforcing the need for formal training.

Theme 4: Implementation of EBP

Quon et al[40] suggested that treatment responses could be slightly variable while following clinical practice guidelines, perhaps reasoning with the findings of this study in which students reported variable treatment responses despite adopting an EBP approach.

Participants mentioned that a quick and general EBP reference search was done for the purpose of paperwork. Although a protocol encouraging EBP at the institution is implemented, the findings of this study questions whether this method is sufficient or could be considered futile incidentally to the role that EBP references are intended to fill.

A lack of literature was reported as a hindrance attempting to justify treatment plans. Despite the chiropractic profession shifting away from early theories and hypotheses to a more evidence-based approach,[41] numerous studies report a lack of literature in the profession as a barrier.[17,18,42,43] There is a lack of a developed research culture across the profession,[44] and observing a consistency in the same report over the last few years reiterates the need for further research.

Students were competent in the implementation of EBP, however, not as proficient as desired. This is relatively consistent with the observation that a passive diffusion of knowledge does not warrant an automatic translation into clinical practice,[45] emphasizing the importance of high-quality EBP education programs to meet the needs of the chiropractic profession.[17]

A lack of supporting literature for content taught was noted to cause confusion in the implementation of desired treatment protocols due to the disparity of what was taught versus the cogency of available evidence. In a similar context, studies from a variety of health professions report that more than half of respondents have concerns of there being a lack of supportive evidence,[38,46–54] reiterating that the preparation of students to inculcate EBP principles is highly dependent on the ability of the faculty to teach and model EBP into clinical training.[55]

Aside from clinicians' lack of engagement with EBP references intended to justify specific treatment plans, the main concern among students who reported a disparity between clinicians' views and theirs was that there seems to be a common trend in which the clinicians only approve of treatment plans based on a self-perceived paradigm, which is not always in sync with the students. A teaching environment as such could be considered contrary to the opinion; a teacher in the clinical setting should implement formal and informal strategies of assessment and feedback to enable further learning, thereby assisting the student to progress.[56] Although participants held a positive attitude toward EBP, the disregard experienced from superiors could later be demotivating, potentially resulting in a negligible method of implementing EBP.

In our study, students found that patient responses to treatment may be different than those reported in the literature. Such cases compelled students to probe into other treatment protocols. This is a common difference between the reality of patient care and concerns about evidence-based treatments.[57–59] The criteria set to carry out treatment research is too specific, and context may differ vastly from patients seen in clinical practice, raising the question on how to generalize the outcomes from the study into clinical practice.[60]

CONCLUSION

The findings illustrate that all students had a positive perception regarding EBP with some students reporting limitations

to its practice. Although students believed the chiropractic course provided a solid foundation, a lack of training in multiple aspects was found. The barriers and challenges encountered by chiropractic students on practicing EBP during their clinical practicum has been discussed along with suggested measures of improvement to aid in the implementation of EBP. The valuable aspects within the chiropractic course have also been highlighted. As a consensus, students felt insufficiently trained in the undergraduate program with regard to EBP and, therefore, recommended a more promising implementation of an evidence-based approach sooner in the program.

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