[RESEARCH ARTCLE]

Determining the attitudes, knowledge, skills and practices of final-year healthcare sciences students regarding evidence-based practice

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ABSTRACT

Introduction: Evidence-based practice (EBP) is crucial for delivering optimal client care. Although healthcare sciences students, including occupational therapy students at the University of Pretoria, receive the same evidence-based practice training, their attitudes, knowledge, skills and practices in EBP remain mostly unknown. Determining these aspects in final-year students is important as it may impact their future practice.
Methods: A non-experimental cross-sectional study was conducted using the Student Evidence-Based Practice Questionnaire. The survey was electronically distributed and completed by 50 final-year healthcare sciences students. Data analysis was performed using measures of central tendency.
Results and Discussion: Participants have positive attitudes related to the implementation of evidence-based practice. However, gaps in practice remain. Students rate their evidence-based practice knowledge as "average", which may impact their practice after graduation. Students report that they are more skilled in certain steps of EBP than others.
Conclusion: The survey results can be used to strengthen evidence-based practice training for healthcare sciences students, potentially improving their ability to implement evidence-based practice after graduation. Several identified barriers to the implementation of evidence-based practice may be overcome through more purposeful training.

Implications for practice

- Positive attitudes towards EBP do not necessarily translate into increased practice and skills in EBP.
- Educators should be aware of the challenges students experience with the different steps of EBP.
- Training of healthcare science students should be developed to include all five steps of EBP.
- Educating students on how to effectively use resources provided by their institutions can improve the evidence they find and apply.

INTRODUCTION

Evidence-based practice (EBP) can be described as the process of using the best evidence in making decisions regarding the care and treatment of clients[1]. According to the Sicily Statement, these decisions should be made by service users in consultation with knowledgeable service providers within their context[2].

Evidence-based practice is important as it makes health professionals, including occupational therapists, accountable for their actions and ensures that practitioners provide their clients with the best possible care and treatment based on the latest evidence[3]. Additionally, EBP encourages lifelong learning and facilitates professional development by encouraging practitioners to remain receptive to learning new techniques and embracing the most recent information after their undergraduate education has ended[4]. Weng et al.[5] explained that the implementation of EBP supports the development of new clinical skills.

The Sicily Statement[2] describes the five steps of EBP, the first being the translation of an observed clinical problem into an answerable question. This is followed by the systematic retrieval of relevant literature (best evidence) as an attempt to answer the question that was identified. The third step entails the critical appraisal of the evidence to ensure relevance and applicability. During the fourth step, the results should be implemented in practice, and lastly, in step number 5, the intervention should be assessed to indicate what can be improved for future use[2]. These steps are, in essence, the same for all health professions, including occupational therapy.

Multiple instruments have been developed to determine the EBP knowledge, attitudes, skills, practice and/or self-efficacy of practising health professionals. Systematic reviews have identified the measurement properties of instruments determining knowledge, skills, attitudes and behaviour[5], as well as attitudes, knowledge and implementation related to EBP[3] in occupational therapy. Both reviews included the Evidence-based Practice Questionnaire[6] originally developed specifically for nurses, as suitable for interprofessional assessment.

Although many health professionals reportedly have a positive attitude toward EBP, the use of EBP has been described as challenging by all, including occupational therapists[3]. This may be due to several barriers that have been described and are summarised[18-31] in Table I (below). These barriers include the perceived lack of time[3,7–9], the lack of resources[9–12], insufficient training[8,13], and the lack of support[14]. Healthcare professionals have also reported limited confidence in using EBP, and that they have limited research skills, and a lack of knowledge regarding EBP and how to implement it[14–16].

Table I: Barriers and facilitators of the implementation of EBP

Type of barrier/facilitator	Examples from literature
Barrier: Personal	Lack of confidence [17–19]
	Lack of time[17,19–26]
	Limited research skills [19,20,26]
	Negative attitudes [17,22,27]
	Lack of familiarity & knowledge of research procedures [22,27,28]
	Reliance on clinical experience rather than research [20]
	Difficulties faced to synthesize information due to overwhelm [21,22]
	Low personal motivation and effort [19]
	Resistance towards change [23,28]
Barrier: Research	Lack of availability of relevant research [19–23,28]
	Scarcity of local knowledge [26]
	Language barriers [26]
	Not using high-quality measuring tools to measure outcomes [29]
Barrier: Training and educational opportunities	Lack of training opportunities in EBP [18,20]
	High-cost implications of education [21]
	Limited availability of continued professional development and postgraduate degrees [26]
Barrier: Organisational considerations	Lack of financial resources [23]
	Lack of facilities and resources [20,24–26]
	Lack of technological advances [20,22]
	Lack of staff communication and collaboration [19]
	Lack of autonomy to implement EBP [22]
	Workload pressure [19]
	Conflicts with client-centred practice [19]
	Lack of support (organisational and managerial) [19,20,22,23,27,28]
Facilitator: Research	Access to information databases [20,23,25]
Facilitator: Training and educational opportunities	Training in research methodology provided [24,27]
	Training in EBP [20,30]
	Access to evidence-based training courses [23,24]
	Post-graduate education has increased the use of EBP [25]
Facilitator: Organisational considerations	Increased awareness of EBP [25]
	Positive and supportive culture [23,28]
	Increased positive attitudes in the public sector [27]
	Interprofessional collaborations [25,28]
	Engaging stakeholders [28]

Although implementation of EBP is challenging, several facilitators that promote the use of EBP have been identified, and are summarised in Table I (page 2). These include training in the use of EBP and raising awareness of the importance of EBP[8,11]. Other facilitators that promote the use of EBP include active participation from students and training in research methods and usage[11]. Considering the multiple barriers and facilitators to EBP, there is increased awareness of the important role quality education in EBP can play in reducing the barriers to EBP by focussing on implementing factors shown to facilitate the development of EBP.

The Sicily Statement recommends that all health professions and training institutions should implement strategies to train students in the health sciences to develop the attitudes, knowledge and skills necessary to implement EBP in their chosen profession[2]. Training should focus on the five steps of EBP and should be assessed to determine competency[2]. Due to the interdisciplinary nature of EBP, this content is well suited to interprofessional education (IPE). Interprofessional education, as recommended by the World Health Organisation[31], should be offered during health professional undergraduate training to ensure that qualifying professionals have a mutual understanding of core concepts (such as EBP). Dawes et al.[2] note that attitudes about EPB of professionals, such as occupational therapists, may be more in agreement with professionals from other disciplines, rather than with professionals from their own discipline, that do not implement EBP.

The healthcare sciences curriculum at the University of Pretoria aims to promote student development of knowledge, positive attitudes and skills in the implementation of EBP as recommended by the Sicily Statement[2]. Evidence-based practice is prioritised in the curriculum in order to address some of the barriers indicated in Table I (page 2), including limited exposure to training in EBP, limited research skills, and lack of EBP knowledge and implementation[8,14,16]. Firstly, educators aim to raise awareness of the importance of EBP across their discipline-specific study modules. In addition to focusing on discipline-specific skills, more generic objectives related to EBP are covered in the research-oriented, interprofessional third-year module, RHC 300. This module aims to foster an understanding of what research is, why it is necessary for the health sciences, identifying and characterising research needs in EBP, and outlining and putting into practice the research process. The RHC300 shared module is a requirement for third-year students of the following disciplines at the University of Pretoria: occupational therapy, physiotherapy, nursing science, human nutrition, speech therapy and audiology, as well as radiography.

Despite comprehensive training related to EBP implemented throughout the curricula, there is limited information on the attitudes, knowledge, skills and practice of EBP as perceived by the final-year healthcare sciences students of the University of Pretoria themselves. Having access to this information could enable educators to review the undergraduate curriculum and their teaching and learning practices to improve student outcomes related to EBP.

METHODOLOGY

Study design

This quantitative, non-experimental, cross-sectional study[32] aimed to collect quantitative data to investigate the attitudes, knowledge, skills and practice of EBP among undergraduate healthcare science students at the University of Pretoria. An online survey was distributed to the target population.

Survey instrument

The survey instrument had two sections. The first section included demographic questions as well as general questions regarding the students' exposure to EBP and how they accessed information. These questions were included to enable the researchers to describe the sample of students who participated in the study.

The second part of the survey consisted of an existing instrument, the Student Evidence-Based Practice Questionnaire (S-EBPQ)[33], used with the authors' permission. This tool was adapted from the original Evidence-Based Practice Questionnaire[6] to be suitable specifically for students. The S-EBPQ makes use of 21 closed-ended items to record the EBP practices, attitudes, knowledge and skills of students on a 7-point Likert scale. Previous factor analyses[34] identified four subscales, including: i) practice consisting of six items, ii) attitudes consisting of three items, iii) retrieving and reviewing evidence consisting of seven items (knowledge and skills) as well as iv) sharing and applying EBP (knowledge and skills) consisting of five items[33]. The factor analysis was confirmed in multiple contexts, including Korea[34] and Australia[35]. This instrument has been utilised in multiple countries, including for example Thailand[36] , Indonesia[37] , Korea[34] Australia[35] and Oman[38], illustrating its cultural adaptability. This instrument has mostly been used with nursing [35,39] and dental[37] students. As far as the researchers are aware, it has not yet been used with occupational therapy students.

After reviewing the S-EBPQ and considering the interdisciplinary nature of EBP within the healthcare sciences curriculum and the wide use of the S-EBPQ around the world, the researchers decided to use this self-report instrument to determine the EBP practices, attitudes, knowledge and skills of the healthcare sciences students at the University of Pretoria. To ensure that the questionnaire would be applicable and comprehensible to students from the different fields of study included in the study, it was sent to an expert panel consisting of lecturers from each of the included departments. These lecturers were involved in the RHC300 research module presented to third-year students and had an understanding of the curriculum of each of the disciplines. The panel was able to comment on the applicability of the questionnaire to the final-year students in their field of study and indicated that the instrument was suitable, with minor recommendations to adapt the language used in the survey to facilitate comprehension. No significant changes to the original questionnaire were made.

Sampling

The researchers made use of purposive sampling. The target population for this study was 233 final-year healthcare sciences students at the University of Pretoria in the year 2024. This included students in occupational therapy, physiotherapy, nursing science, human nutrition, speech and audiology, and radiography who all previously completed the RHC300 research module. These students were recruited via an announcement posted to their final-year research module on the university's learning management system. The researchers aimed for a response rate of 20% or more from the sampling population of 235 students[40].

Procedure

The researchers made use of an online survey to ensure full anonymity and to increase accessibility[36] to the different student groups as fourth-year students are frequently away from campus for clinical work. Additionally, online questionnaires are a low-cost data collection method[36] that was preferred by the researchers. Qualtrics™ was used to create the online survey.

Before sending out the questionnaire, the research group obtained ethical approval (621/2023) from the Health Science Ethics Committee at the University of Pretoria. The survey was piloted with five community service occupational therapists who completed their studies at the University of Pretoria in 2023. They provided feedback regarding the comprehensibility of the questionnaire and the usability of the online platform. Their suggestions were taken into consideration and changes were made with regard to grammar and the sequence of the questions.

The link to the final survey was shared via the final-year research modules on the learning management system of the University of Pretoria for the students to access. Although low response rates and self-selection bias were identified as potential limitations to the use of an online survey[41], the researchers attempted to overcome this by sending weekly reminders for four weeks. The questionnaire link remained open for six weeks to give students ample opportunity to participate. Before

the students were given access to the survey, they were asked to read through the description of the study and had to give their informed consent to proceed.

Data analysis

Descriptive statistics were performed to summarise the participants' practice, attitudes, knowledge and skills related to evidence-based practice (EBP). The frequency distribution, medians, and modes were calculated in order to provide a clear overview of the data.

RESULTS

Fifty students completed the survey, with the final response rate of the study calculated as 21.25%. Table II (below) illustrates that the majority of participants were occupational therapy students (n=18, 36%), followed by radiography (n=10, 20%) and speech and audiology students (n=9, 18%).

Table II: Fields of study of the participants (N=50)

	Target population (students in class) (n=233)	Number of participants (n=50)	Percentage (%)
Occupational Therapy	43	18	36%
Radiography	50	10	20%
Speech therapy and Audiology	26	9	18%
Physiotherapy	52	8	16%
Nursing Sciences	28	3	6%
Human Nutrition	34	2	4%

In terms of exposure to EBP, the majority of students, 96% (n=48), reported that their lecturers included EBP in their modules. It was found that 68% (n=34) of participants were aware of more than three of their modules that integrated EBP, while 32% (n=16) of participants were only aware of three or fewer modules utilising EBP.

Table III (below) reflects how students accessed information. These findings show that although students do use digital search tools like Google (n=16; 32%) and seek advice from a clinical supervisor (n=14; 28%), a sizable group (n=8; 16%) also turn to lecturers for assistance. Using the university library was the least popular method to access information, as only one student reported using the library (n=1; 2%). The results also indicated that 66% (n=33) of the participants reported having full access to scholarly articles.

Table III: Accessing new information

Accessing new information	Frequency (n)	Percentage (%)
Primary method of obtaining new evidence		
Google	16	32%
Ask a clinical supervisor	14	28%
Google Scholar	9	18%
Ask a lecturer	8	16%
Other	2	4%
University Library	1	2%
Students reporting full access to articles		
Yes	33	66%
No	17	34%

Subscales of the Student Evidence-Based Practice Questionnaire (S-EBPQ)

The four subscales of the S-EBPQ were utilised to organise the results obtained from the 21 items of the questionnaire that were included in the survey.

The first subscale *Practice*[28] included six items. Participants were asked to rate the frequency of their practices from 1 (never) to 7 (always). The frequency, median, and modes for the practice subscale can be viewed in Table IV, page 5 The majority of participants perceived their ability to track down evidence (Mdn=5) and evaluate outcomes (Mdn=5) as higher than their ability to analyse evidence (Mdn=3). Notably, the mode for analysing evidence is 2 since 26% of participants selected that option. Analysing evidence is the only item on which a participant (n=1; 2%) indicated that they "never" analyse the data.

Table IV: Frequency, median and mode for practice

Items	1 Never	2	3	4	5	6	7 Always	**Median**	**Mode**
Formulate question	n=0 0%	n= 5 10%	n=13 26%	n=13 26%	n=16 32%	n=2 4%	n=1 2%	4	5
Track down evidence	n=0 0%	n=2 4%	n=4 8%	n=17 34%	n=23 46%	n=3 6%	n=1 2%	5	5
Analyse evidence	n=1 2%	n=1 3 26%	n= 12 24%	n= 12 24%	n=7 14%	n=2 4%	n=3 6%	3	2
Integrate evidence	n=0 0%	n=3 6%	n=3 6%	n=8 16%	n=23 46%	n=7 14%	n=6 12%	5	5
Evaluate outcomes	n=0 0%	n=2 4%	n=9 18%	n=10 20%	n=17 34%	n=8 16%	n=4 8%	5	5
Share information	n=0 0%	n=5 10%	n= 12 24%	n=14 28%	n=7 14%	n=7 14%	n=5 10%	4	4

The second subscale *Attitudes*[28] included three items. The frequencies for the attitude subscale can be viewed in Figure I, below. In this question, participants had to indicate a position on a scale between two opposing statements, as reflected in Figure I.

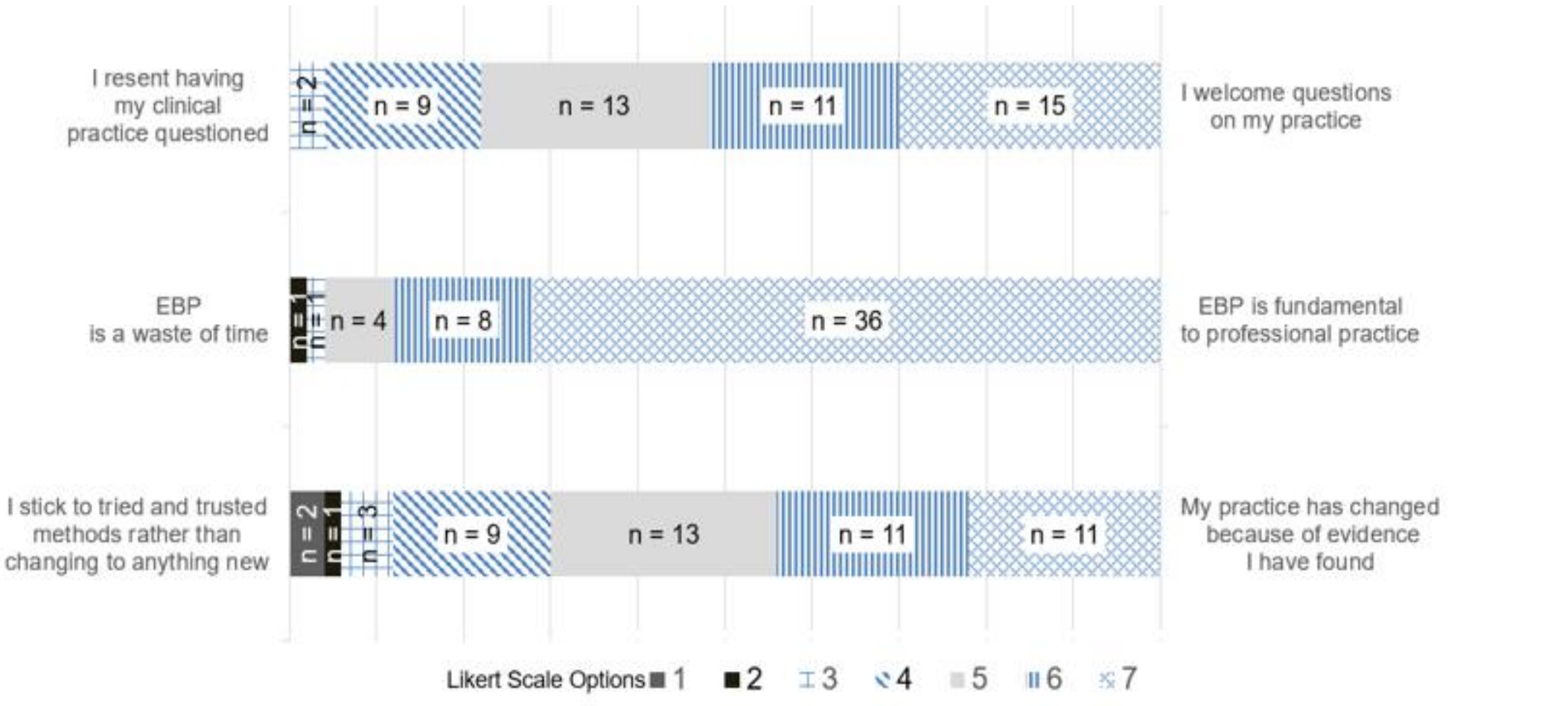

Figure I: Frequency for Attitudes subscale

The majority (n=34, 78%) of participants have a positive attitude towards having their practice questioned. With a median of 6 and a mode of 7, it is evident that the participants perceived being questioned on their practice as positive. The majority of participants (n=44, 88%) view EBP as fundamental with the median and mode being 7. Only a small fraction (n=2, 4%) of the participants view EBP as a waste of time. Most of the participants (n=35, 70%) reported being open to change based on new evidence while a smaller portion reported preferring to stick to traditional methods.

The third subscale *sharing and applying EBP*[28] (including questions on knowledge and skill) included six items. The frequencies, median and mode for the sharing and applying EBP subscale can be viewed in Table V, page 6 Participants were asked to rate their skills from 1 (poor) to 7 (best).

Table V: Frequency, median and mode for sharing and applying EBP subscale

Items	1 (Poor)	2	3	4	5	6	7 (Best)	Median	Mode
Ability to identify gaps in practice	n=1	n=0	n=4	n=9	n=18	n=12	n=6	5	5
	2%	0%	8%	18%	36%	24%	12%		
Ability to apply informatio n	n=0	n=2	n=2	n=10	n=23	n=10	n=3	5	5
	0%	4%	4%	20%	46%	20%	6%		
Ability to share informatio n with colleagues	n=0	n=1	n=1	n=9	n=12	n=15	n=12	6	6
	0%	2%	2%	18%	24%	30%	24%		
Integrate evidence	n=0	n=3	n=3	n=8	n=23	n=7	n=6	5	5
	0%	6%	6%	16%	46%	14%	12%		
Ability to disseminat e new ideas to colleagues	n=0	n=3	n=5	n=12	n=18	n=7	n=5	5	5
	0%	6%	10%	24%	36%	14%	10%		
Ability to review own practice	n=0	n=1	n=3	n=8	n=18	n=14	n=6	5	5
	0%	2%	6%	16%	36%	28%	12%		

In Table V (above) it can be seen that the majority of the participants scored themselves 4 and above (n=45; 90%) for their ability to identify gaps in practice. The participants also scored themselves relatively highly for their ability to apply information (Mdn= 5), ability to share information with colleagues (Mdn= 6), ability to integrate information (Mdn= 6), and ability to disseminate new ideas to colleagues (Mdn= 5).

The last subscale *retrieving and reviewing of evidence*[28] (including questions on knowledge and skills) included seven items. The frequency, median, and modes for the retrieving and reviewing of evidence subscale can be viewed in Table VI, (below). Participants were asked to rate their skills from 1 (poor) to 7 (best).

Table VI: Frequency, median and mode for retrieving and reviewing evidence

Items	1 (Poor)	2	3	4	5	6	7 (Best)	Median	Mode
Research skills	n=0 0%	n=2 4%	n=4 8%	n=13 26%	n=25 50%	n=4 8%	n=2 4%	5	5
Formulating a research question	n= 1 2%	n= 1 2%	n=10 20%	n= 22 44%	n= 11 22%	n= 5 10%	n= 0 0%	4	4
Awareness of types of information	n= 0 0%	n= 0 0%	n=7 14%	n= 6 12%	n=13 26%	n= 11 22%	n=13 26%	5	5
Knowledge on retrieving evidence	n= 0 0%	n= 0 0%	n= 6 12%	n=10 20%	n= 12 24%	n=16 32%	n= 6 12%	5	6
Ability to analyse evidence	n= 0 0%	n=3 6%	n=13 26%	n=17 34%	n=8 16%	n=8 16%	n= 1 2%	4	4
Ability to determine validity	n= 0 0%	n= 6 12%	n=13 26%	n=10 20%	n = 14 28%	n= 6 12%	n= 1 2%	4	5
Ability to determine usefulness of material	n= 0 0%	n=3 6%	n= 9 18%	n= 12 24%	n= 9 18%	n=13 26%	n=4 8%	5	6

The majority (n=31, 62%) of the participants perceived their research skills to be 5 or higher, with the median being 5. The majority of the participants indicated that they perceived their ability to retrieve evidence (Mdn=5) and determine the usefulness thereof (Mdn=5) to be greater than their ability to formulate a research question (Mdn=4), analyse evidence (Mdn=4) and determine validity (Mdn =4).

DISCUSSION

The study determined the self-reported EBP practices, attitudes, knowledge and skills of final-year healthcare science students at the University of Pretoria. The results of this study are important since healthcare education should ideally equip students with the attitudes, knowledge and skills to implement EBP after graduation[42]. Ladyshewsky[43] explained that novice practitioners need to be trained in EBP to ensure proper integration of their knowledge and practice from their academic to clinical settings[43]. Novice professionals should apply EBP to inform their clinical reasoning since clinical experiences do not necessarily mirror the theoretical knowledge they have learned during their training. This may be of particular importance in the South African context, where new graduates are required to complete their community service year – often without adequate supervision, mentorship or support[44].

The study found that final-year students have a positive attitude toward EBP. This positive attitude is essential for the successful implementation of the EBP steps into daily practice[45]. Although the participants predominantly had positive attitudes about EBP, their positive attitudes did not fully align with the frequency of their implementation into practice. This aligns with other studies utilising the same instrument conducted in different contexts, including with undergraduate students in Oman[38] and Indonesia[46]. Although the attitude of healthcare science students toward EBP is high, specific interventions may be needed to close the gap between their positive attitude and implemented practices.

Additionally, it was found that participants rated themselves as more knowledgeable and skilled in certain steps of EBP such as evidence tracking, evaluating outcomes, and sharing information, while they view themselves as less knowledgeable in other steps such as formulating a research question, analysing evidence, and adapting to new evidence. The variability in knowledge and skill levels between different steps of EBP has also been reported in other studies. Researchers have identified, for example, difficulties in formulating a question[47,48], as well as challenges in searching and retrieving information[47,49]. This may limit the implementation of EBP into practice, indicating that some steps of EBP may be used in practice less than others.

When formulating a research question, it is important to consider that an incorrect question can lead to challenges in the information retrieval process. If asking the wrong question, students may struggle to find the necessary information or end up gathering irrelevant data that they cannot use effectively. A well-formulated research question is essential for efficient and targeted information retrieval. Literature supports the notion that difficulties in formulating a research question may be a barrier to the implementation of EBP and that some steps of EBP should be emphasised when teaching healthcare professionals[50]. Clearly, all the steps are important for the effective implementation of EBP and should be addressed more specifically in the curriculum.

Difficulties in analysing retrieved evidence may also be seen as a barrier since participants indicated that they analyse the evidence that they gather before implementation less frequently than what they actually apply EBP. Challenges with analysing evidence have also been noted in other studies[47,51]. This can lead to inappropriate use of identified information[52]. Eliminating this step of EBP can have negative implications on the reliability and relevance of the evidence found since the process is compromised when a step is eliminated[4]. According to the literature, more emphasis is placed on how to find evidence than on teaching students how to analyse and apply the newly found evidence[7,42,50].

The manner in which the students accessed information provides valuable insights. Interestingly, the majority of the participants preferred Google (a potentially less reliable and rigorous source) to locate evidence rather than using the university's library that enables access to the highest available levels of evidence[34]. The survey does not allow for an explanation of why students may refer to Google, but according to literature, lack of time to perform complex searches is a barrier to the implementation of EBP and could explain why participants want to use the fastest and most user-friendly manner, which is well known to most participants. As students will have access to Google even after graduation, it is important that they are able to utilise the web to identify information. Research has shown that the use of electronic knowledge resources by professionals is associated with an increased ability by professionals to answer questions and influence client outcomes positively[53].

Even though it is not the participants' primary method to gather information, access to databases via the university library can be seen as a facilitator since it promotes the tracking and retrieval of evidence. This correlates to the literature stating that access to databases is a facilitator in the use of EBP[35]. Even though all students have access to the same journal articles, many students seemed unaware of their access. This is clearly problematic as basic awareness of the availability of resources is necessary before students can be expected to make use of the resources. This may be overcome by educating students on library use (e.g. database searches) and by requiring them to access the library in multiple modules[33]. Collaboration with information specialists/librarians has been recommended to ensure that students are skilful in this process[54,55].

Although participants rated their attitudes toward EBP higher than their knowledge, it was noted that most of the participants still rated knowledge regarding EBP positively. This finding contrasts with previous studies which stated that healthcare professionals reported having limited research skills and thus have challenges with implementing EBP, as they are unsure of the steps that need to be followed[5,10,17]. The article further contrasts with studies that identified knowledge[15-16, 30] as a significant barrier to EBP implementation. This may reflect the effect of education and training on the components of EBP as implemented in the university curriculum.

Based on the results of the study, it was evident that the continuous exposure to EBP in multiple modules is a facilitator since it promoted the participants' knowledge of EBP and their understanding of the importance thereof. This correlates with the literature which stated that training in EBP is a facilitator in the implementation of EBP in trained professionals[10,13]. It was noted that EBP is widely used in the majority of the participants' modules. Multi-faceted education strategies[42] that focus on teaching all the steps in EBP[50] have been recommended to ensure that healthcare sciences students are best prepared for practice after graduation.

Recommendations

It is recommended that the students' education in terms of EBP is implemented across different theoretical modules as well as during clinical fieldwork to increase their exposure to EBP and provide ample opportunities to practice and implement EBP. All of the steps of EBP should be taught and emphasised to ensure that students have knowledge and skill in all areas of EBP. Particular attention should be given to teaching students to formulate a question and evaluate the information that they find. The students should receive training on how to effectively use the library early in their studies in order to improve the manner in which they locate information and build their confidence.

It is recommended to investigate how EBP is taught and implemented at other institutions to potentially identify strategies that foster the development of skills in EBP. The authors further recommend that specific teaching practices or programmes for EBP should be experimentally studied to determine which teaching strategies have the

best results. Literature supports this recommendation, as limited rigorous studies have been conducted on this topic[56].

It is also recommended that this cohort of students complete the Evidence-based Practice Questionnaire again later to determine whether they retain their positive attitudes to EBP. Investigating the experiences of students during the implementation of EBP may also be helpful in highlighting the unique challenges that students in the South African context experience.

Limitations

This study does not provide data on the effect of a specific educational method or programme implemented. Since the measure was a self-report questionnaire, limitations such as personal biases should be considered. There is a possibility that the participants provided academically desired answers instead of providing answers according to their specific context and experience. Additionally, the instrument used was not validated with all the professions included in the study or in the wider South African context.

Since this questionnaire was sent out using an online platform, there was a low response rate predicted. Some of the departments had limited responses, meaning that not all the students' views have been reported on. The original questionnaire does not include an interpretation of the scores, limiting the research team's ability to analyse whether the participants' knowledge and skills on EBP are sufficient. The development of an assessment instrument with established norms for knowledge of EBP can be helpful in determining whether final-year students are prepared for practice.

CONCLUSION

This study indicates the importance of equipping undergraduate students with knowledge and skills regarding the implementation of EBP. Evidence-based practice is widely applied in the curricula of undergraduate healthcare science students, which is a positive indication of EBP development. Even though students may have positive attitudes towards EBP, there are still gaps in the implementation thereof in daily clinical practice. By addressing the gaps in the implementation through training, raising awareness of the university's available resources, and increasing exposure to EBP, the readiness of novice practitioners to enter their community service year may be improved. Students need to receive training that is specific to the steps of EBP that they find difficult and complex. The implementation of EBP can be enhanced by overcoming barriers and ensuring ongoing support to cultivate effective healthcare education for undergraduate students.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Author Contributions

Karin van Niekerk: Supervision of study, conceptualisation, methodology, data analysis, editing of manuscript
Suzanne Harmse: Supervision of study, conceptualisation, methodology, editing of manuscript
Anice Gous, Liné van der Westhuizen, Anita Hellberg, Karla de Wet, Mogale Manthata: Literature review, data collection, data analysis, writing of first draft of manuscript and editing manuscript. All authors approved the final version of the manuscript.

REFERENCES:

1. Sackett DL et al. Evidence based medicine: what it is and what it isn't. BMJ (Clinical research ed.). 1996;312(7023):71–2.
2. Dawes M et al. Sicily statement on evidence-based practice. BMC Medical Education. 2005;5. https://doi.org/10.1186/1472-6920-5-1
3. Upton D, Stephens D, Williams B, Scurlock-Evans L. Occupational therapists' attitudes, knowledge, and implementation of evidence-based practice: A systematic review of published research. British Journal of Occupational Therapy. 2014;77(1):24–38. https://doi.org/10.4276/030802214X13887685335544
4. Spring B. Evidence-based practice in clinical psychology: What it is, why it matters; what you need to know. Journal of Clinical Psychology. 2007;63(7):611–631. https://doi.org/10.1002/jclp.20373
5. Weng YH et al. Implementation of evidence-based practice across medical, nursing, pharmacological and allied healthcare professionals: A questionnaire survey in nationwide hospital settings. Implementation Science. 2013;8(1). https://doi.org/10.1186/1748-5908-8-112
6. Buchanan H, Siegfried N, Jelsma J. Survey Instruments for Knowledge, Skills, Attitudes and Behaviour Related to Evidence-based Practice in Occupational Therapy: A Systematic Review. 2016. https://doi.org/10.1002/oti.1398
7. Upton D, Upton P. Development of an evidence-based practice questionnaire for nurses. Journal of Advanced Nursing. 2006;53(4):454–458. https://doi.org/10.1111/j.1365-2648.2006.03739.x
8. Thomas A, Law M. Research utilization and evidence-based practice in occupational therapy: A scoping study. American Journal of Occupational Therapy. 2013;67(4). https://doi.org/10.5014/ajot.2013.006395
9. Graham F, Robertson L, Anderson J. New Zealand occupational therapists' views on evidence-based practice: A replicated survey of attitudes, confidence and behaviours. Australian Occupational Therapy Journal. 2013;60(2):120–128. https://doi.org/10.1111/1440-1630.12000
10. Lindström AC, Bernhardsson S. Evidence-based practice in primary care occupational therapy: A cross-sectional survey in Sweden. Occupational Therapy International. 2018;2018. https://doi.org/10.1155/2018/5376764
11. Graham F, Rodger S, Ziviani J. Enabling occupational performance of children through coaching parents: Three case reports. Physical and Occupational Therapy in Pediatrics. 2010;30(1):4–15. https://doi.org/10.3109/01942630903337536
12. Lin SH, Murphy SL, Robinson JC. The issue is··· facilitating evidence-based practice: Process, strategies, and resources. American Journal of Occupational Therapy. 2010;64(1):164–171. https://doi.org/10.5014/ajot.64.1.164
13. Ubbink DT, Guyatt GH, Vermeulen H. Framework of policy recommendations for implementation of evidence-based practice: a systematic scoping review. http://bmjopen.bmj.com. https://doi.org/10.1136/bmjopen-2012
14. Thomas A et al. Individual and organizational factors associated with evidence-based practice among physical and occupational therapy recent graduates: A cross-sectional national study. Journal of Evaluation in Clinical Practice. 2021;27(5):1044–1055. https://doi.org/10.1111/jep.13518
15. Jordan P, Bowers C, Morton D. Barriers to implementing evidence-based practice in a private intensive care unit in the Eastern Cape. Southern African Journal of Critical Care. 2016;32(2):50–54. https://doi.org/10.7196/SAJCC.2016.v32i2.253
16. McNett M et al. A Qualitative Force Field Analysis of Facilitators and Barriers to Evidence-Based Practice in Healthcare Using an Implementation Framework. Global Implementation Research and Applications. 2022;2(3):195–208. https://doi.org/10.1007/s43477-022-00051-6
17. Garcia J et al. Evidence-based practice and clinical reasoning in occupational therapy: A cross-sectional survey in Chile. Australian Occupational Therapy Journal. 2021;68(2):169–179. https://doi.org/10.1111/1440-1630.12713

18. Thomas A, Law M. Research utilization and evidence-based practice Occupational Therapy. 2013;67(4). https://doi.org/10.5014/ajot.2013.006395
19. Thomas A et al. Individual and organizational factors associated with evidence-based practice among physical and occupational therapy recent graduates: A cross-sectional national study. Journal of Evaluation in Clinical Practice. 2021;27(5):1044–1055. https://doi.org/10.1111/jep.13518
20. Upton D, Stephens D, Williams B, Scurlock-Evans L. Occupational therapists' attitudes, knowledge, and implementation of evidence-based practice: A systematic review of published research. British Journal of Occupational Therapy. 2014;77(1):24–38. https://doi.org/10.4276/030802214X13887685335544
21. Graham F, Robertson L, Anderson J. New Zealand occupational therapists' views on evidence-based practice: A replicated survey of attitudes, confidence and behaviours. Australian Occupational Therapy Journal. 2013;60(2):120–128. https://doi.org/10.1111/1440-1630.12000
22. Lindström AC, Bernhardsson S. Evidence-based practice in primary care occupational therapy: A cross-sectional survey in Sweden. Occupational Therapy International. 2018;2018. https://doi.org/10.1155/2018/5376764
23. Jordan P, Bowers C, Morton D. Barriers to implementing evidence-based practice in a private intensive care unit in the Eastern Cape. Southern African Journal of Critical Care. 2016;32(2):50–54. https://doi.org/10.7196/SAJCC.2016.v32i2.253
24. Kalavani K, Mohebbifar R, Rafiei S. Evidence based practice among healthcare providers: a cross-sectional study. International Journal of Health Care Quality Assurance. 2019;32(5):867–878. https://doi.org/10.1108/IJHCQA-08-2017-0162
25. Ayoubian A, Nasiripour AA, Tabibi SJ, Bahadori M. Evaluation of Facilitators and Barriers to Implementing Evidence-Based Practice in the Health Services: A Systematic Review. Galen Medical Journal. 2020;9:1645. https://doi.org/10.31661/gmj.v9i0.1645
26. Lin SH, Murphy SL, Robinson JC. The issue is··· facilitating evidence-based practice: Process, strategies, and resources. American Journal of Occupational Therapy. 2010;64(1):164–171. https://doi.org/10.5014/ajot.64.1.164
27. Garcia J et al. Evidence-based practice and clinical reasoning in occupational therapy: A cross-sectional survey in Chile. Australian Occupational Therapy Journal. 2021;68(2):169–179. https://doi.org/10.1111/1440-1630.12713
28. Padmanabhanunni A, Sui XC. Mental healthcare providers' attitudes towards the adoption of evidence-based practice in the treatment of post-traumatic stress disorder in South Africa. South African Journal of Psychology. 2017;47(2):198–208. https://doi.org/10.1177/0081246316673244
29. McNett M et al. A Qualitative Force Field Analysis of Facilitators and Barriers to Evidence-Based Practice in Healthcare Using an Implementation Framework. Global Implementation Research and Applications. 2022;2(3):195–208. https://doi.org/10.1007/s43477-022-00051-6
30. Albarqouni L et al. Core Competencies in Evidence-Based Practice for Health Professionals: Consensus Statement Based on a Systematic Review and Delphi Survey. JAMA network open. 2018;1(2):e180281. https://doi.org/10.1001/jamanetworkopen.2018.0281
31. Moore JL, Graham ID. Accelerating the Implementation of Evidence-Based Practice in Physical Medicine and Rehabilitation. Archives of Physical Medicine and Rehabilitation. 2022;103(7):S252–S255. https://doi.org/10.1016/j.apmr.2021.03.045
32. World Health Organization. Framework for Action on Interprofessional Education & Collaborative Practice. 2010. http://www.who.int/hrh/nursing_midwifery/en/
33. Brink H, Van der Walt C, Van Rensburg GH. Fundamentals of research methodology for health care professionals. 4th Ed. Juta and Company; 2018.
34. Upton P, Scurlock-Evans L, Upton D. Development of the Student Evidence-based Practice Questionnaire (S-EBPQ). Nurse Education Today. 2016;37:38–44. https://doi.org/10.1016/j.nedt.2015.11.010
35. Park JE, Hwang JI. Psychometric Evaluation of the Korean Version of the Student Evidence-Based Practice Questionnaire (S-EBPQ). Asian Nursing Research. 2021;15(1):47–52. https://doi.org/10.1016/j.anr.2020.10.003
36. Beccaria L, Beccaria G, McCosker C. A Confirmatory Factor Analysis of the Student Evidence-Based Practice Questionnaire (S-EBPQ) in an Australian sample. Nurse Education Today. 2018;62(October 2017):69–73. https://doi.org/10.1016/j.nedt.2017.12.010. https://doi.org/10.1016/j.nedt.2017.12.010
37. Nantsupawat A et al. Factors influencing evidence-based practice among undergraduate nursing students: A cross-sectional analysis. International Journal of Nursing Sciences. 2023;10(3):367–372. https://doi.org/10.1016/j.ijnss.2023.06.002
38. Baqir AH, Firman DR, Putri FM. Survey of Dental Students' Self-Perceived Practice, Attitudes, and Knowledge Toward Evidence-Based Dentistry in Indonesia. Jurnal Pendidikan Kedokteran Indonesia: The Indonesian Journal of Medical Education. 12(1):41–48. https://doi.org/https://doi.org/10.22146/jpki.68089
39. Madhavanprabhakaran G, Arulappan J, Achora S, Alsaraireh A. Evidence-based practice competency and barriers among undergraduate nursing students in a Middle Eastern country. Teaching and Learning in Nursing. 2023;000:1–8. https://doi.org/10.1016/j.teln.2023.07.009.
40. Rojjanasrirat W, Rice J. Evidence-based practice knowledge, attitudes, and practice of online graduate nursing students. Nurse Education Today. 2017;53:48–53. https://doi.org/10.1016/j.nedt.2017.04.005
41. Van Mol C. Improving web survey efficiency: the impact of an extra reminder and reminder content on web survey response. International Journal of Social Research Methodology. 2017;20(4):317–327. https://doi.org/10.1080/13645579.2016.1185255
42. Siva M, Nayak DP, Siva M, Narayan KA. Strengths and Weakness of Online Surveys. IOSR Journal of Humanities and Social Sciences. 24(5). https://doi.org/10.9790/0837-2405053138
43. Larsen CM, Terkelsen AS, Carlsen AMF, Kristensen HK. Methods for teaching evidence-based practice: A scoping review. BMC Medical Education. 2019;19(1). https://doi.org/10.1186/s12909-019-1681-0
44. Ladyshewsky RK. John Colbert Building Competency in the Novice Allied Health Professional through Peer Coaching. Source: Journal of Allied Health. 2010;39(2):77–82. https://www.jstor.org/stable/10.2307/48721620. https://doi.org/10.2307/48721620
45. van Stormbroek K, Buchanan H. Community Service Occupational Therapists: thriving or just surviving? South African Journal of Occupational Therapy. 2016;46(3):63–72. https://doi.org/10.17159/23103833/2016/v46n3a11
46. Padmanabhanunni A, Sui XC. Mental healthcare providers' attitudes towards the adoption of evidence-based practice in the treatment of post-traumatic stress disorder in South Africa. South African Journal of Psychology. 2017;47(2):198–208. https://doi.org/10.1177/0081246316673244
47. Baqir AH, Firman DR, Putri FM. Original research survey of dental students' self-perceived practice, attitude, and knowledge toward

evidence-based dentistry in Indonesia. The Indonesian Journal of Medical Education. 2023;12(1):41–48. https://doi.org/10.22146/jpki.68089
48. Thorsteinsson HS. Icelandic nurses' beliefs, skills, and resources associated with evidence-based practice and related factors: A national survey. Worldviews on Evidence-Based Nursing. 2013;10(2):116–126. https://doi.org/10.1111/j.1741-6787.2012.00260.x
49. Boström AM, Ehrenberg A, Gustavsson JP, Wallin L. Registered nurses' application of evidence-based practice: A national survey. Journal of Evaluation in Clinical Practice. 2009;15(6):1159–1163. https://doi.org/10.1111/j.1365-2753.2009.01316.x
50. Thorsteinsson HS, Sveinsdóttir H. Readiness for and predictors of evidence-based practice of acute-care nurses: A cross-sectional postal survey. Scandinavian Journal of Caring Sciences. 2014;28(3):572–581. https://doi.org/10.1111/scs.12083
51. Albarqouni L, Hoffmann T, Glasziou P. Evidence-based practice educational intervention studies: A systematic review of what is taught and how it is measured. BMC Medical Education. 2018;18(1). https://doi.org/10.1186/s12909-018-1284-1
52. Ross J. Information Literacy for Evidence-Based Practice in Perianesthesia Nurses: Readiness for Evidence-Based Practice. Journal of PeriAnesthesia Nursing. 2010;25(2):64–70. https://www.sciencedirect.com/science/article/pii/S1089947210000419. https://doi.org/https://doi.org/10.1016/j.jopan.2010.01.007
53. Landsverk NG, Olsen NR, Brovold T. Instruments measuring evidence-based practice behavior, attitudes, and self-efficacy among healthcare professionals: a systematic review of measurement properties. Implementation Science. 2023;18(1). https://doi.org/10.1186/s13012-023-01301-3
54. Maggio LA et al. Impact of electronic knowledge resources on clinical and learning outcomes: Systematic review and meta-analysis. Journal of Medical Internet Research. 2019;21(7). https://doi.org/10.2196/13315
55. Boruff JT, Thomas A. Integrating evidence-based practice and information literacy skills in teaching physical and occupational therapy students. Health Information and Libraries Journal. 2011;28(4):264–272. https://doi.org/10.1111/j.1471-1842.2011.00953.x
56. Vogel KA. Librarians and Occupational Therapy Faculty. Source: Journal of Allied Health. 2012;41(1):15–20. https://doi.org/10.2307/48721719