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EVIDENCE-BASED PRACTICE IN OPTOMETRY: ARE THE KNOWLEDGE CARRIED FORWARD BY STUDENTS AFTER GRADUATION?

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Abstract

The aim of this study is to explore the perceived benefit of Evidence-based practice (EBP) as teaching and learning approaches in undergraduate optometry program. The perceived benefit of EBP was measured using Taipei Evidence-Based Practice Questionnaire (TEBPQ). TEBPQ consists of 26 self-reported items, which include domains of 'Ask', 'Acquire', 'Appraisal', 'Apply' and 'Attitude'. The questionnaire was administered to two cohorts of Optometry students. Thirteen students in cohort 2018/2019 (new graduates) and 35 students in cohort 2019/2020 (ongoing training) completed the questionnaire. The highest score for students in cohort 2018/2019 was for 'Ask' domain (3.26±0.41) and the lowest score was for 'Apply' domain (3.05±0.57). The highest score for students in cohort 2019/2020 was for 'Ask' domain (3.22±0.35) and the lowest score is 'Appraisal' domain (3.02±0.41). However, two-samples Mann-Whitney U test showed no significant difference for all four domains in EBP between the two cohorts ($p>0.05$). 'Attitude' domain also showed no significant difference between the two cohorts ($p>0.05$). In this study, both cohorts of optometry students showed equal EBP related knowledge and they have good attitude towards the importance of EBP competencies in clinical decision making.

Keywords: education, learning, optometry, questionnaire, teaching

Abstrak

Tujuan kajian ini dilakukan adalah untuk menentukan persepsi pelajar terhadap manfaat *Evidence-based practice* (EBP) yang digunakan dalam kaedah pengajaran dan pembelajaran dalam program prasiswazah optometri. Persepsi pelajar diukur menggunakan *Taipei Evidence-Based Practice Questionnaire* (TEBPQ). TEBPQ terdiri dari 26 item sendiri yang merangkumi domain 'Ask', 'Acquire', 'Appraisal', 'Apply' dan 'Attitude'. Soal selidik ditadbir ke atas dua kohort pelajar Optometri. Seramai 13 orang pelajar dari kohort 2018/2019 dan 35 pelajar dari kohort 2019/2020 menjawab soal-selidik ini. Skor tertinggi untuk pelajar kohort 2018/2019 adalah untuk domain 'Ask' (3.26 ± 0.41) dan skor terendah adalah untuk domain 'Apply' (3.05 ± 0.57). Skor tertinggi untuk pelajar kohort 2019/2020 juga adalah domain 'Ask' (3.22 ± 0.35) dan terendah untuk domain 'Appraisal' (3.02 ± 0.41). Namun, ujian dua sampel Mann-Whitney U menunjukkan tiada perbezaan yang signifikan di antara kedua-dua kohort pelajar untuk semua domain EBP ($p > 0.05$). Domain 'Attitude' juga tidak menunjukkan perbezaan yang signifikan di antara kedua-dua kohort ($p > 0.05$). Kajian ini mendapati kedua-dua kohort pelajar optometri menunjukkan pengetahuan EBP yang setara dan mereka mempunyai sikap yang baik terhadap kepentingan kompetensi EBP dalam membuat keputusan klinikal.

Kata kunci: optometri, pembelajaran, pendidikan, pengajaran, soal selidik.

1.0 INTRODUCTION

In recent years, evidence-based practice (EBP) has been advocated in the field of medicine and allied health sciences including optometry (Elliot 2012; McCluskey 2003). EBP is an approach that integrates high-quality scientific research evidences into the best practical decisions to improve patient's health or outcomes (Steglitz et al. 2015). The principle of EBP is integration of three aspects which are the best available clinical evidences, the clinical experiences and knowledge of clinicians and the patient's needs and values. Clinical evidences refer to the scientific research findings published in reputable journals. These include systematic reviews, randomized clinical trials, clinical practice guidelines, case-control study, observational study and others.

Optometrists are primary eye care providers whose role includes diagnosis of ocular anomalies and common ocular diseases, and prescription of a range of optical devices and vision therapy. The role of optometrists has also expanded to other areas of eye care such as orthokeratology, myopia control and behavioral optometry (Suttle et al. 2012). The application

of clinical evidences in optometry practice can be in the choice of best examination procedures for diagnosis of ocular conditions and ocular diseases, or to determine available treatment options that provide best outcomes for a particular ocular condition (Anderton 2007).

To practice EBP in clinical decision making, the undergraduates must have various skill and knowledge of EBP process. In recent years, EBP has gained recognition among higher institution that offers optometry course and is being incorporated in the curriculum (Adam 2008; Anderton 2007). The process of conducting EBP involve four steps. The first step is 'Ask' in which all possible clinical problems are listed from the clinical scenario using a method known as PICO (P: population, I: intervention, C: comparison and O: outcomes). Step 2 is 'Acquire' in which keywords are identified from step 1 and literature search is performed in the electronic database (such as Cochrane Library or PubMed). Step 3 is 'Appraisal' where the related articles found in step 2 is critically appraised and step 4 is 'Apply' where the best clinical evidences is applied in the clinical practice and used in the patient examination and management (Chen et al. 2014a). In a review of EBP teaching strategies, Horntvedt et al. (2018) advocated use of interactive and clinically integrated teaching strategies rather than classroom didactic or stand-alone teaching to enhance EBP knowledge and skills among undergraduate students.

Despite the introduction of EBP in optometry curriculum, previous study in Australia found that practicing optometrists only have rudimentary understanding of the process involved in EBP (Alnahedh et al. 2015). Previous study has also reported that optometrists rely on knowledge learnt during their formal education in optometry rather than sourcing new research findings from evidence-based database (Suttle et al. 2012). To the best of our knowledge, no published work has been reported on the implementation of EBP in optometry courses in Malaysia. Universiti Kebangsaan Malaysia (UKM) is the first university in Malaysia that offers undergraduate optometry program almost 30 years ago. In current optometry curriculum taught in UKM, EBP is implemented in one of the course in final year. EBP teaching approach is used to equip the students with the knowledge and skills of EBP process so that it can be utilize in their clinical training as well as clinical practice after they have graduated. Therefore, the objective of this study is to determine the perceived benefit of evidence-based practice (EBP) among newly graduate and undergraduate UKM optometry students.

2.0 MATERIALS AND METHODS

2.1 Population and Sample

This study use quantitative survey design. The research population of this study is optometry students from cohort 2018/2019 who have graduated 6 months at the point of this study and final year undergraduate optometry student from cohort 2019/2020. There were 26 students in cohort 2018/2019 and 36 students in cohort 2019/2020 who enrolled in a course (Diagnosis and Refractive Treatment) that use EBP approaches as its teaching and learning strategy. The course was offered in the first semester of their final year. All students who participated in this study have successfully completed the course.

2.2 Teaching and Learning Strategy for EBP

Interactive teaching strategies were used throughout Diagnosis and Refractive Treatment course comprising of lecture, hands-on workshop and group work assignment as suggested by Horntvedt et al. (2018). The lecture covers the topic of EBP principle and process which was given in two hours. This is followed by a workshop on literature search using evidence-based database (8 hours). For the remaining weeks of their study, students conduct the four step of EBP process ('Ask', 'Acquire', 'Appraisal' and 'Apply') based on the clinical scenario assigned to them. The four steps process in the EBP and minimum number of hours spent for each step is shown in Figure 1.

The students were divided into small groups of four to five people. Each group was given a clinical scenario to be solved using EBP process. The students were also given written instruction of their weekly task. Table 1 showed an example of the tasks performed by the students using a clinical scenario of age-related macular degeneration and management reading difficulties. To facilitate students in the EBP process, each group was assigned with a facilitator who is the subject matter expert, based on the clinical scenario given to the group. The role of facilitators was (1) to guide the students with the formulation of clinical questions based on clinical scenario; (2) initiate analytical and critical thinking through guiding questions; (3) provide feedback to the students during 'Ask' and 'Appraisal' sessions.

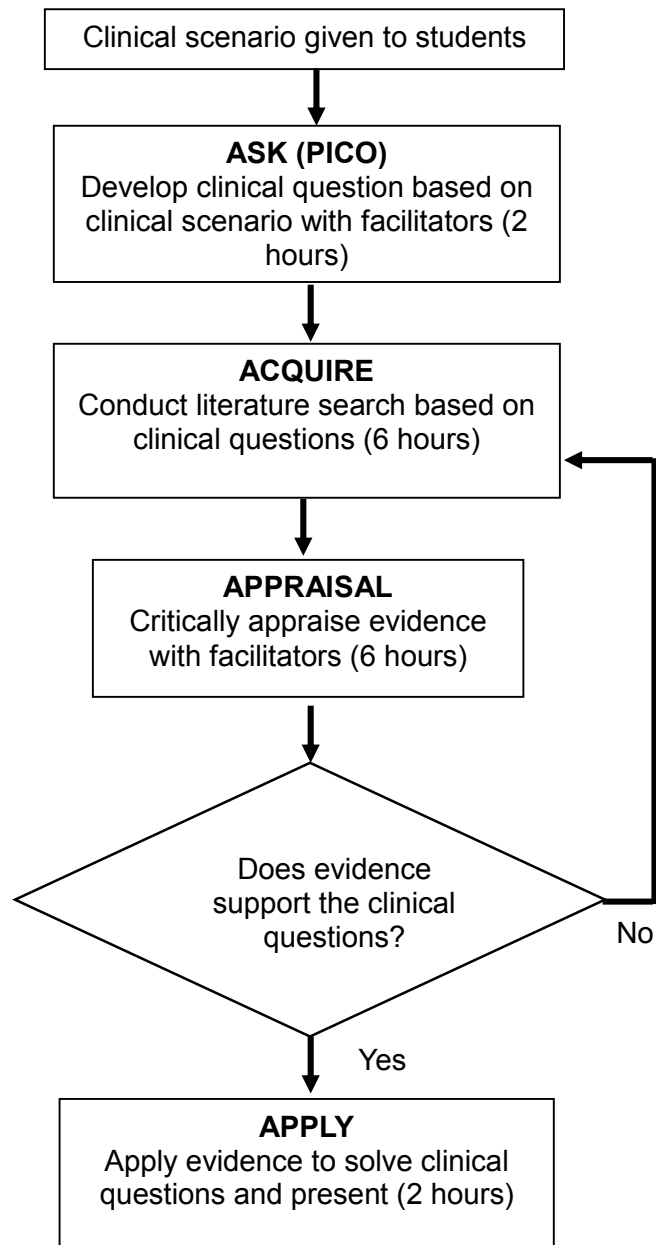


Figure 1: Process in Evidence-based Practice

Table 1: Example of clinical scenario and EBP process performed by the students.

Clinical scenario	A 50 years old lady complaints of seeing distorted images when she try to read. She has been diagnosed with age-related macular degeneration and referred to UKM Clinic for vision assessment and optical intervention.
Ask	<p>Clinical questions were developed based on clinical scenario using PICO, e.g.</p> <p>P – Which visual functions are affected by age-related macular degeneration?</p> <p>I – What can be done to improve reading performance of patient with age-related macular degeneration?</p> <p>C – Is vertical reading strategy better than steady eye strategy in improving reading performance of patient with age-related macular degeneration?</p> <p>O – What are the possible outcomes of reading intervention given to the patient?</p>
Acquire	PICO related keywords (e.g. age-related macular degeneration, steady eye strategy, vertical reading, and reading performance) were used to perform a literature search using database such as PubMed and Cochrane Library.
Appraisal	<p>Articles from literature search were selected and appraised critically. Evidence table is used to extract the relevant information such as</p> <ol style="list-style-type: none"> 1. Authors, Title, Journal, Year, Volume, Page number. 2. Study design, Sample size, Follow up (if any) 3. Outcomes, Results and Conclusion. 4. Limitation of study
Apply	The evidences from literature were apply to the clinical scenario and used in the presentation.

2.3 Instrumentation

The instrument used in this study is the Taipei Evidence-Based Practice Questionnaire (TEBPQ) (Chen et al. 2014b). The questionnaire was developed adopting to the four processes in EBP that include domains of 'Ask' (ask an answerable questions, 5 items), 'Acquire' (find evidence from database, 7 items), 'Appraisal' (critically appraise the evidence,

4 items) and 'Apply' (use the evidence in clinical practice, 6 items). In addition, Chen et al. (2014b) added another domain of 'Attitude' (attitude towards usefulness of EBP, 4 items) because previous study has shown that attitude is an important factor in learning motivation and future willingness to practice clinical EBP (Branch & Paranjape 2002). The items in 'Attitude' domain were related to attitude towards EBP concept, knowledge, skills and competencies in clinical settings and practice. The questionnaire has total content validity index of 0.90 and Cronbach's alpha value of 0.87 (Chen et al. 2014b). Likert scale 1 (strongly disagree) to 4 (strongly agree) was used. An option of 'not relevant' was also added to the questionnaire to address possibility of items not relevant to their current practice. The survey was done using Google Form and the link was sent out to respondents using telephone messaging app (Whatsapp).

2.4 Data Analysis

The IBM SPSS version 25 (IBM SPSS, Armonk, USA) was used for all statistical analysis. Mean and standard deviations were used to summarize the continuous data. The Shapiro-Wilk test showed data was not normally distributed, therefore, two-sample Mann-Whitney U test (two-tailed) was used to compare the scores for all domains between the two cohorts. A value of $p < 0.05$ was considered statistically significance.

3.0 RESULTS AND DISCUSSION

A total of 48 students responded to the TEBPQ questionnaire. For cohort 2018/19 thirteen out of 26 students responded to the survey, 10 females and 3 males. For cohort 2019/20, 35 out of 36 students responded to the survey (28 females and 7 males). The response rates were 50% and 97% for cohort 2018/19 and cohort 2019/20 respectively. The low response rate for cohort 2018/19 could be due to unwillingness of the graduated students to participate in this study and inability to contact them using messaging app (Whatsapp).

3.1 TEBPQ scores

Table 2 showed the scores of four domain of TEBPQ questionnaire ('Ask', 'Acquire', 'Appraisal' and 'Apply'). The score for domain 'Attitude' is not included because it was not part of EBP process. The highest mean score for both cohorts was for domain 'Ask' (mean_{2018/19} = 3.26; mean_{2019/20} = 3.22). 'Ask' is the first step of the EBP process where students should be able to think of the possible clinical questions pertaining to the case scenario during their practice or clinical training. To do this, the students must apply knowledge that they have learned prior to clinical year. The results of this study suggest that both cohorts perceived that 'Ask' is the domain that they were most able to perform. This is similar to study by Chen et al.

(2014a) that also found highest score for domain 'Ask' among registered nurses. High scores in this domain could be due to the lower cognitive levels required to perform the task compared to other tasks in EBP process. To perform 'Ask', students are required to remember, understand and apply learnt knowledge. On the other hand, step 2 'Acquire' is actually a new skill that they only learn during the course itself. It involved understanding of electronic database such as Cochrane Library, PubMed and OVID and so on. Thus, more practice is needed before they can be skilful. For step 3 'Appraisal', higher cognitive level is required where they must be able to break down the information acquire through literature and linked it to the clinical questions. At this stage, student must use their critical thinking to appraise the articles that can provide answers to the clinical questions. In the last step 'Apply', higher order thinking is needed to judge and select the most relevant information to be integrated into the clinical decision making.

Table 2: Mean (SD) of four EBP process for cohort 2018/2019 and 2019/2020.

TEBPQ Domain	Cohort 2018/2019	Cohort 2019/2020
	(n=13)	(n = 35)
	Mean (SD)	Mean (SD)
Ask	3.26 (0.41)	3.22 (0.35)
Acquire	3.19 (0.39)	3.04 (0.34)
Appraisal	3.08 (0.48)	3.02 (0.34)
Apply	3.05 (0.57)	3.16 (0.28)

For lowest mean score, it was found that cohort 2018/19 scored lowest for domain 'Apply' (mean = 3.05). 'Apply' is the last step in EBP process in which the students should be able to use clinical evidences in patients management. In this study, cohort 2018/19 are newly graduate optometry students, and the results suggests that although they will able to utilize the EBP process in formulating the clinical questions (as indicated by highest scores in 'Ask' domain), they perceived that they are not able to apply the evidence in patient management. This is because newly graduate students do not have enough experience to integrate relevant research findings with their own experience to meet the patient's need. Hence, they rely mainly on knowledge learned during their undergraduate study in clinical decision making. In fact previous study in Australia and New Zealand found that most optometrists prefer to use knowledge and information gained during their undergraduate or postgraduate studies rather than utilizing new clinical research findings (Suttle et al. 2012). Poor utilization of evidence

into practice despite good knowledge and skills of EBP among other health profession such as nurses has also been reported in the past (Bashar 2019).

For cohort 2019/20, the lowest mean score was for domain 'Appraisal' (mean = 3.02). The process of appraisal requires higher level of cognitive functions and this could be difficult to the inexperienced students. Similar finding was found by Chen et al. (2014b) that reported lowest score for 'Appraisal' using TEBPQ among healthcare professionals. In another study, it was reported that many practicing optometrists are not familiar with high-level secondary evidence such as clinical practice guidelines and Cochrane systematic reviews (Alnahedh et al. 2015). Therefore, lack of time to find and read research findings from primary source was given for low uptake in use of EBP. Similar finding was reported in a literature review by Alatawi et al. (2020). This underscore the importance of formal education on use of electronic database for effective literature search in current optometry curriculum. In addition, undergraduate optometry students should be exposed to the skills and knowledge of the EBP process so they can utilize it at work.

3.2 Comparison between cohorts

Comparison of all four TEBPQ domains showed no significant difference between the two cohorts ($p > 0.50$) (Table 3). Although students from cohort 2018/19 have graduated for six months at the point of this study, they have similar EBP related knowledge with undergraduate students who are undergoing the course.

For domain 'Attitude', the results showed both cohorts agree that knowledge and skills in EBP is important in clinical settings and competencies in EBP would help significantly in their practice. Similar positive attitude towards EBP among optometrist, medical and health professionals has been reported in the past (Alnahedh et al. 2015; Chen et al. 2014b; Ilic and Forbes 2010, Bashar 2019). Thus proper training in EBP related knowledge is important to increase the use of EBP in patient management among optometrist.

The outcomes of this study suggest that EBP learning strategies are beneficial to optometry undergraduate student. Despite the challenges in implementation and practice of EBP, experts in the field clearly emphasized on the need for EBP principles to be integrated throughout all elements of healthcare professions curricula (Lehane et al. 2019). To the best of our knowledge, there is no published work on EBP in optometry program offered in Malaysia. Future study can be conducted to determine educators' readiness, barriers and facilitators of EBP implementation in optometry program nationwide.

Table 3: Comparison between cohort 2018/2019 and 2019/2020

TEBPQ Do main	Students	Mean (SD)	Z value; p-value
Ask	Cohort 2018/2019	3.26 (0.41)	-0.06; 0.95
	Cohort 2019/2020	3.22 (0.35)	
Acquire	Cohort 2018/2019	3.19 (0.39)	-1.40; 0.16
	Cohort 2019/2020	3.04 (0.34)	
Appraisal	Cohort 2018/2019	3.08 (0.48)	-0.45; 0.65
	Cohort 2019/2020	3.02 (0.34)	
Apply	Cohort 2018/2019	3.05 (0.57)	-0.46; 0.64
	Cohort 2019/2020	3.16 (0.28)	
Attitude	Cohort 2018/2019	3.19 (0.34)	-0.30; 0.77
	Cohort 2019/2020	3.25 (0.38)	

Some limitations were inherent in this study. First, the small sample size due to poor response from the students in cohort 2018/19. Second, the TEBPQ questionnaire was not administered before the EBP teaching strategy was introduced to the students. Therefore, it is not possible to compare pre and post TEBPQ scores to determine changes in perception before and after the course.

4.0 CONCLUSION

In this study, the newly graduated and undergraduate optometry students had similar EBP related knowledge and therefore have benefitted from the teaching and learning strategy used in the optometry curriculum. Both cohort of students demonstrated good attitude towards the importance of EBP competencies in clinical decision making.

5.0 ACKNOWLEDGEMENTS

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