American Journal of Educational Research, 2019, Vol. 7, No. 5, 356-359
Available online at http://pubs.sciepub.com/education/7/5/3
Published by Science and Education Publishing
DOI:10.12691/education-7-5-3

The Application of Case-Based English Literature Learning as a New Approach in Medical Teaching

Xiaomei Yao*, Ciri Chandana Raguthu

Department of Physiology and Pathophysiology, School of Basic Medicine, Tianjin Medical University, Tianjin, China
*Corresponding author: Yaoxm@tmu.edu.cn

Received March 17, 2019; Revised April 27, 2019; Accepted May 15, 2019

Abstract The present study demonstrates that the application of case-based English literature learning in combination with lecture-based learning is beneficial in learning basic and clinical knowledge. In addition, spending time with students interactively and summarizing the English literature in continuous elective courses is helpful.

Keywords: *medical education research, undergraduate, methods*

Cite This Article: Xiaomei Yao, and Ciri Chandana Raguthu, "The Application of Case-Based English Literature Learning as a New Approach in Medical Teaching." *American Journal of Educational Research*, vol. 7, no. 5 (2019): 356-359. doi: 10.12691/education-7-5-3.

1. Introduction

Pathophysiology is the basic medical science that studies the occurrence, development, mechanism and outcome of a disease. By explaining the nature and fundamentals of the disease, it acts as a bridging subject between basic medicine and clinical medicine. The mechanisms of pathophysiology are the targets for treatment and the basis for effective control of human disease. In China, third year medical students have no scientific or clinical research experience, making it difficult for them to link the basic theory of pathophysiology with the clinical disease. Therefore, it is more often memorized than understood. Furthermore, stimulating the enthusiasm of the students by way of the traditional teaching method is not easy, which results in reduced learning efficiency.

One of the aims of this study was to explore the possibility of strengthening foundational knowledge by applying the case-based English literature learning as a new approach in the teaching of pathophysiology. The emerging challenges in medical education support the effectiveness of implementing trans-disciplinary case-based learning [1]. Unlike the traditional teaching method, in which foundational knowledge is passively transferred from the instructors to the students during lecture, case-based learning has been helpful for students in the medical field. However, many classical cases in case-based learning cannot keep up with the development of modern medical testing techniques and breakthrough of treatment methods. The students of this generation have grown up in an environment in which they are exposed to unlimited information, encouraging the aptitude for web-based, self-taught ways of learning, as opposed to lecture-based learning [2]. A unique character of this study is to improve case-based learning by requiring students to explore current, English case literatures online (www.pubmed.com), which are closer to the international frontier rather than the classroom lecture-based learning. This is to ensure that the contents of the study are at the cutting edge of clinical medicine. The study of the latest case-based English literature is synergistically combined with the lecture-based textbook learning focuses on the pathophysiological theory, the etiology, the effects on the body, the principles of treatment as well as the latest advances in technology.

Another aim of this study was to compare the effects of two different methods with unique types of case-based English literature learning: Method 1, independent case-based English literature learning following lecture-based textbook learning; Method 2, elective course consisting of in-class instruction with dedicated time for interactive discussion of the case-based English literature learning. Through these two methods of case-based English literature learning, we aim to motivate students to better understand the basic knowledge from textbooks and recent advancements in the clinical aspect this field, as well as to provide them with the ability to apply this knowledge in future practice.

2. Methods

Third year medical students (Classes of 2015 and 2016, N=300) majoring in clinical medicine and anesthesia in Tianjin Medical University participated in this study. All students took part in the pathophysiology theory course as well as the case-based English literature learning. This experiment took place during discussion of the topic of potassium metabolism disorders in the pathophysiology theory course. The educational process commenced as follows: During the pathophysiology theory course, students were asked to further study the case-based English literatures on www.pubmed.com with the keywords of "hypokalemia", "hyperkalemia", and "thyrotoxic periodic paralysis (TPP)", with publications

within the last 10 years. The students divided themselves into groups and the leader of each group was told to select an SCI indexed case literature. No two teams had the same literature. A total of 35 articles (including related case reports and reviews) were translated into Chinese. The translated files were shared among the students. Students were asked to independently analyze the original English full text paper and the translated version, and answer the provided questions, which were used as one of the criteria to evaluate the students.

Among the 300 students, 240 students did not take part in the elective course, this group was regarded as the method 1 group (N=240). The remaining 60 students simultaneously took part in the elective course with case discussion, this group was regarded as the method 2 group (N=60). Students in both method 1 and 2 groups were required to make a summary on their own of every translated literature based on age, precipitating factors, mechanisms, important clinical findings, laboratory findings, and principles of treatment, and answer Table 1 as evaluations. Students in method 2 groups were required to answer Table 2 according to the group interactive discussions in the elective course, which was another indicator of the students' performances.

Table 1. Questions on Case-Based English Literature Learning

Literature Title:
1. What are the basic theories in pathophysiology you have learned from literature? Please list a few examples.
2. What recent advances you have learned from literature that are not available in textbooks? Please list a few examples.
3. What specialized English vocabulary did you learn about potassium metabolism? Please list a few examples.
4. What are the main obstacles in case-based English literature learning?

Table 2. Case-Based Literature Summary

Literature Title:
Concept & Epidemiologic Morbidity of TPP
Nationality & Race & Gender & Age of Patient
Previous History: including history of periodic paralysis, history of hyperthyroidism (Graves' disease), history of hypertension (maximum BP) or diabetes, family history of genetic disease
Etiology: Graves' disease, nodular goiter, iodine induced thyrotoxicity, excessive thyroxine use, thyroid adenoma, lymphocytic thyroiditis, pituitary adenoma, others
Precipitating Factors: History of high carbohydrate intake before onset, strenuous exercise or tiredness before onset, history of heavy drinking before onset, infection history, history of subcutaneous injection of insulin or usage of catecholamine, glucose or corticosteroids.
Effects on the body: BP, R, T, HR (Arrhythmia or not) & Weakness (involvement of skeletal, respiratory) & Cardiac symptom & Hyperthyroidism (hyperthyroid exophthalmos, thyroid nodule, thyroid gland enlargement) & Metabolism and Mental Changes (sweating, defecation, weight decrease, enhanced gastrointestinal activities, anxiety, insomnia and irritability)
ECG Changes: U wave, ST depression, Tachycardia, Prolongation of PR interval, QRS and other abnormalities.
Laboratory Examination: Thyroid Function & Electrolytes & Urinary Tests
Therapeutic Drugs: Potassium supplementation & Anti-thyroid drugs & Diuretics & Antibiotics & Prednisolone & Other
Mechanisms of TPP: Na^+-K^+-ATPase & Insulin Level Increase & Catecholamines Level Increase & Aldosterone Level & Androgen Level & Genetic Factor
Prognosis: Changes of Weakness & Thyroid function & Electrolytes & Urinary Tests, Recurrence or continuous medication

Since giving and receiving feedback proved to be a efficacious step in catering to the students' individual needs and in encouraging a student-centered education, a questionnaire survey was performed in both groups. The questionnaire was anonymous. Feedback from the students was collected to investigate the difference between the students who participated in the elective course (Method 2 Group, N=60) and those who did not take part in the elective course (Method 1 Group, N=240). Study design is described in Figure 1.

The result of questionnaire was analyzed by SPSS 16.0 statistical software. χ^2 test was used and $P < 0.05$ was regarded as statistically significant.

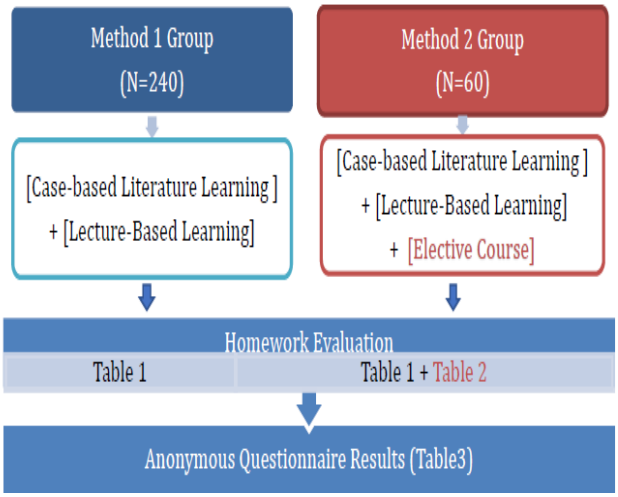

Figure 1. (Color online) Study design

3. Results

3.1. The Effect of Case-based English Literature Learning in Students without Elective Course

In the group of students that opted out of the elective course (Method 1 Group, N=240), through the case-based English literature learning, there were 205 (85.42%) students that believed their knowledge and understanding was broadened and their ability to analyze and solve problems as a physician was improved. They also regarded the latest case-base English literature learning as a beneficial supplement to traditional lecture learning. 204 (85.00%) of the students considered that the latest case-based English literature learning was more helpful than the traditional lecture in mastering the basic theoretical knowledge, in addition to gaining a more thorough and comprehensive understanding of the basic topics. 184 (76.67%) students believed that case-based English learning was helpful to stimulate the interest of learning, as it is patient-centered and learner-centered, offering a stronger learning stimulus to solve the problem concerning the patient. 191 (79.58%) students thought to have gained an enhanced understanding of medical English vocabulary, and 145 (60.42%) students thought that their self-learning ability, willingness to help others and team cooperation had improved due to this experience.

Table 3. Comparing the Effect of the Case-Based English Literature Learning between Students with Elective Course (Method 2 Group) and Students without Elective Course (Method 1 Group)

GROUP (N)	Stimulate Students' Interests	Learn Medical Vocabulary	Master Basic Knowledge	Broaden Textbook Knowledge	Foster Spirit of Teamwork
Method 1 Group (n=240)	184 (76.67%)	191 (79.58%)	204 (85.00%)	205 (85.42%)	145 (60.42%)
Method 2 Group (n=60)	58 (100.00%)	59 (100.00%)	59 (100.00%)	60 (100.00%)	58 (100.00%)
$\chi 2$	12.311	12.150	7.892	9.906	28.829
p	0.000	0.000	0.005	0.002	0.000

3.2. The Effect of Case-based English Literature Learning in Students with or without Elective Course

Statistical analysis demonstrated that there was a significant difference in the feedback results between the two groups, the students who took part in the continuous elective course (Method 2 Group, N=60) and those who did not take part in the elective course (Method 1 Group, N=240). These results prove that further summarization and interactive discussion of the translated literatures in the continuous elective courses determined better feedback results. The students who took part in the elective course (Method 2 Group) had more abundant and detailed understanding of the literature, and considered it to be more helpful in broadening and strengthening the basic theoretical knowledge and stimulating the interest of study pathophysiology. The students also believed that it was beneficial for them in accumulating English medical vocabulary, and improving teamwork, reading comprehension, and self-learning abilities (all $P < 0.05$). (Table 3)

In addition, all students were asked to participate in a survey in order to get a better understanding of their experience. Some of the questions included: "what are the basic theories in pathophysiology that you have learned from the English literature?" and "what recent advances have you learned from the English literature that cannot be found in the Chinese textbooks?" From the results of the survey, we were able to conclude that the basic knowledge obtained from the lecture-based learning in combination with the case-based English literature learning, allowed students to understand the clinical case literature in more detail. Furthermore, the case-based English literature study presented the students with more knowledge than did the textbook, like the concept of hypokalemia periodic paralysis, gene mutation, various electrocardiogram (ECG) changes in TPP with hypokalemia, and the association between the serum potassium level and ECG representative changes, to name a few.

Another question in the questionnaire was: "what are the main obstacles that you faced in case-based English literature learning?" Many of the students reported that they had difficulty in understanding the English literature. Since this was their first encounter with case-based English literature learning, their vocabulary of professional medical English was inadequate, which in turn affected their translation, reading and understanding of the literature.

4. Discussion

This study highlights two key findings that play a key role in the effectiveness of medical education. One is the effectiveness of independent learning with case-based English literature in combination with traditional lecture-based textbook learning. Another is the benefit of further discussion and summarization of the translated literatures in the continuous elective course on student performance. As ascertaining positive learning outcome is very important [3].

Firstly, we demonstrated that independent study of case-based English literature after the pathophysiology theory class can help students link the knowledge attained from the traditional theory course with recent clinical cases. It can also stimulate the students' enthusiasm in learning. The colloquially termed "5-year gap" between research paper and clinical practice is well documented and the larger gap between research paper and the textbook is still prevalent today [1]. The application of the latest case-based English literature learning may give rise to a path between the traditional lecture-based learning and the practice of clinical medicine, particularly when it is intended to promote knowledge acquisition by keeping up-to-date with the recent medical progress, transferring knowledge to professional practice and being able to better serve patients. As medical science, technology and knowledge are all updated with time, the methods of latest case-based English literature learning can stimulate the students' enthusiasm, and be utilized throughout one's career. Moreover, the ability of an autonomous acquisition of knowledge by self-learning should be cultivated as a lifelong learning method in any medical students' career.

Secondly, the reason for the statistically significant differences in the students' feedback in the continuous elective courses, can be related to the fact that these students have gotten the opportunity to re-study and summarize the literature in a systemic and careful manner. The teachers became the facilitators of learning as well, which makes the continuous elective courses with summarization and interactive discussion on the literatures more effective. One feature is that, students taking part in the elective courses are going through a process like flipped classroom learning session [2]. The students prepared with self-learning before the session, which then solidifies the learning through the elective course itself. Another feature of this study is that, all students were focusing on one disease (TPP) with up-to-date reports and reviews, then, they had to take part in the continuous elective course work as a team. Although each student worked on one case literature, following the interactive questions from the teacher, every student had to part in summarizing the characteristics of the disease, from epidemiology, clinical features, physical examination, laboratory findings, recent progress in pathogenesis, treatment and prognosis. The interactive questions were established based on data from case-based literatures with

the aim of reviewing the lecture-based textbook knowledge, training clinical reasoning by putting the content into use and solving the patient's problem. Fostering and developing students' capacity for solving clinical problems will have a beneficial effect in future medical practice and research [4].

There are limitations to this case-based English literature learning approach, which remains, yet to be investigated. The reading comprehension of medical English literature is one of the most important skills in order to successfully advance and develop in medical career. Some students had very poor professional English foundation, had difficulty understanding the medical English literature. For these students, the time spent outside of class for literature study can vary. Continued participation in elective course with further summarized cased-based learning through interactive discussion among students and teachers, has revealed beneficial effects on new knowledge understanding and also on overcoming the difficulties in language learning and the study burden due to insufficient time.

5. Conclusion

This study emphasizes the importance of educators, as they serve, not only as distributors of content, but also as facilitators of learning and assessors of competency [4]. Spending time with students interactively and summarizing the English literature in continuous elective courses has proven to be extremely helpful. The application of case-based English literature learning in combination with lecture-based learning has a beneficial effect increasing the students' motivation towards basic and clinical medical knowledge learning. It also positively reinforced the students' previously learned knowledge from textbooks.

Acknowledgements

This work is supported by National Natural Science Foundation of China (grant number 81874257), Project of National Brand Course of Pathophysiology for International Students & Education, Project from Basic School of Medicine, Tianjin Medical University, Tianjin Science & Technology Council Grant of China (grant number 16JCYBJC26100).

References

[1] Bela R. Turk, Rabea Krexner, Ferdinand Otto, Thomas Wrba, Henriette Löffler-Stastka. "Not The Ghost in The Machine: Transforming Patient Data into E-Learning Cases Within A Case-Based Blended Learning Framework For Medical Education," *Procedia - Social and Behavioral Sciences,* 186: 713-725. 2015.

[2] Hopkins L, Hampton BS, Abbott JF, Buery-Joyner SD, Craig LB, Dalrymple JL, Forstein DA, Graziano SC, McKenzie ML, Pradham A, et al. "To the point: medical education, technology, and the millennial learner," *Am J Obstet Gynecol.* 218(2): 188-192. 2018.

[3] Michael Hortsch. "How we learn may not always be good for us – Do new electronic teaching approaches always result in better learning outcomes?" *Med Teach* 37: 507-509. 2015.

[4] Sadideen H, Plonczak A, Saadeddin M, Kneebone R. "How Educational Theory Can Inform the Training and Practice of Plastic Surgeons," *Plast Reconstr Surg Glob Open*. 6(12): e2042. 2018.