The Study of Peer-Assisted Learning and Self-Regulated Learning through Clinical-Years Medical Students' Perspectives

Sakarn Charoensakulchai, M.D.[1], Anupong Kantiwong, M.D., M.Ed.[2]
[1] Department of Parasitology, Phramongkutklao College of Medicine, Bangkok 10400, Thailand
[2] Medical Education Unit, Phramongkutklao College of Medicine, Bangkok 10400, Thailand

Received 2 September 2020 • Revised 9 October 2020 • Accepted 8 November 2020 • Published online 1 January 2021

Abstract:

Background: Clinical-years learning is a part of undergraduate medical training that shifted from lectured-based learning to outcome-based education focusing on authentic situation. There are several learning methods which clinical-years medical students can use for academic achievement such as peer-assisted learning (PAL) and self-regulated learning (SRL).

Objective: This study aimed to assess effectiveness of PAL and SRL in clinical medical students' perspectives.

Methods: A total of 142 medical students responded to standardized 5-rating scale questionnaire including 6 aspects of perspectives; knowledge acquired, accuracy of information given, clinical skills acquired, active learning stimulation, comfortable learning environment and time consumption. Exploratory factor analysis (EFA) demonstrating component matrix of perspective on PAL and SRL effectiveness were analyzed.

Results: SRL had higher factor loadings (λ) on perspectives toward knowledge acquired, active learning stimulation and comfortable learning environment than PAL (λ_{SRL} = 0.799, 0.781 and 0.809 respectively and λPAL = 0.707, 0.658 and 0.632 respectively); however, PAL yielded greater factor loadings on clinical skills learning and time consumption (λ_{PAL} = 0.717 and 0.858 respectively) in comparison with SRL (λ_{SRL} = 0.521 and 0.703 respectively). There were almost an equal factor loading when regard to the perspectives toward accuracy of information given (λ_{PAL} = 0.784 and λ_{SRL} = 0.783).

Conclusion: PAL had high impact on clinical skills learning because peer-learners could interact with peer-teachers. SRL provided much knowledge acquired because researching and summarizing information individually would promote long-term memories and stimulated active learning in many medical students. Both methods should be encouraged simultaneously in order to promote successful learning outcomes.

Keywords: Medical students, Peer-assisted learning, Self-regulated learning

Corresponding author: Anupong Kantiwong, MD, MEd
Medical Education Unit, Phramongkutklao College of Medicine, Bangkok, 10400 Thailand
E-mail: k22k_art@hotmail.com
GMSMJ 2021; 1 (1): 33-39

Introduction

During the course of six-year medical training program in Thailand, clinical-year is an important step that transfer from traditional lecture-based learning toward outcome-based and authentic education. Several learning modes during pre-clinical years, especially case-based learning, play important roles in orientating and enhancing medical students' ability to apply their basic science knowledge to social and medical sciences as well as preparing them for workplace situations[1,2]. Although being well prepared, the prompt shift into new environments could resulted in stress which likely to affect their performances and educational outcomes[3]. In this tumultuous situation, medical students must adapt to new forms of clinical education by finding their suitable methods of learning and strategies. In this digital era, there are several methods, learning resources and resource persons which clinical-years medical students can access according to their favor such as staffs, residents and seniors' teaching and modeling, discussion and tutoring with peers and self-learning from several available resources[4-6].

Peer-assisted learning (PAL) is gaining momentum in clinical education. PAL is an umbrella term covering peer teaching, peer learning, peer mentoring, peer assessment and peer leadership[7]. Peer teaching is beneficial for medical students to develop valuable clinical skills and gain experience in teaching as well as mentoring relationship between peers[8,9].

In clinical context, it is undeniable that students must take control of their own learning. This learning method is defined as self-regulated learning (SRL)[10]. This learning method has always been used in medical education as it promoted students' cognitive and psychomotor skills[11, 12]. However, SRL in clinical settings was highly attributed to environments and was influenced by several other persons in these environments such as instructors, residents and peers[10, 13]. Thus, SRL is the learning method which required some degrees of guidance, facilitation and supports, as similar to problem-oriented learning[13, 14].

At Phramongkutklao College of Medicine, transforming to clinical years is a great leap of medical students. They must adapt themselves to new learning styles, environments and social processes. This study aimed to evaluate effectiveness of PAL and SRL in clinical medical students' perspectives in order to address benefits of each learning methods for developing clinical curriculum which is suitable for the students.

Methods

Study design

This study is a part of the curriculum development which engaged clinical-years medical students' perspectives and opinions toward clinical learning methods for management of the curriculum. In this study, the descriptive cross-sectional study was conducted during October 2017 at Phramongkutklao College of Medicine and Phramongkutklao Hospital, the college's teaching hospital.

Study population

The targeted population of this study was clinical-years medical students. This study was preliminary study, as such, the sample size was total population of clinical-years medical students at Phramongkutklao College of Medicine which were fourth, fifth and sixth years. Excluded from this study were sixth year medical students who – during the time this study was conducted – were rotating outside of Phramongkutklao Hospital which made contacts

and collection of responses difficult.

Questionnaire and data collection

A 5-Likert scale questionnaire was developed. Score of 5 was defined as highly agree, while score of 1 meant highly disagree. The questionnaire included questionnaire regarding perspectives of clinical-years medical students toward PAL and SRL in six aspects which were knowledge acquired, accuracy of information, clinical skills acquired, active learning stimulation, learning environment and time consumption. The questionnaire was examined by 3 experts on medical education and tested for reliability by alpha-coefficient which used 0.70 as the threshold of reliability of the questionnaire. From all items, it yielded the alpha-coefficient of 0.75. Thus, the questionnaire was deemed reliable and valid. The questionnaire was made online and distributed to all clinical-years medical students. Students' responses were stored in online datasheet.

Statistical analysis

Statistical analysis was performed on IBM SPSS 22.0 (Armonk, New York, US). Descriptive statistics were used for describe general characteristics of samples. Exploratory analysis was used for evaluate impact factors of students' perspectives of each aspect toward PAL and SRL. Factor loadings of 0.5 or greater[15] were indicated that students' perspectives were likely to be more clustered and oriented toward the same direction than perspectives with lower factor loadings.

Ethical consideration

This study was medical education research which was exempted from ethical approval by Institutional Review Board of Royal Thai Army Medical Department. The exemption number was CodeR218q/60_Exp.

Results

From 200 students, 142 (71.000%) responded. Most (63, 44.366%) were fourth-year medical students. Fifth- and sixth-year students were 59 (41.549%) and 20 (14.085%) respectively. Male students were 73 (51.408%). Students with grade point average (GPA) of 3.00-3.49 (B) shared highest proportion in fourth- and fifth-year (36, 25.352% and 22, 15.493% respectively). Most sixth-year students (8, 5.634%) had GPA of 3.50 and above (B+ and A). The baseline characteristics classified by clinical years were displayed in Table 1. Mean score of students' perspectives toward PAL and SRL were shown in Table 2.

Exploratory factor analysis

EFA revealed students' perspectives toward PAL and SRL. Statistical analysis showed that SRL had high factor loadings (λ) of clinical-years medical students' perspectives toward knowledge acquired, active learning stimulation and learning environment ($\lambda_{SRL} = 0.799, 0.781$ and 0.809, respectively). There were high factor loadings of students' perspectives on clinical skills acquired and time consumption toward PAL (λ_{PAL} = 0.717 and 0.858, respectively). The EFA results were shown in Table 2.

Discussion

This study addressed perspectives of clinical-years medical students toward PAL and SRL. It should be noted that EFA was used for addressing important issues from PAL

and SRL in students' perspectives rather than for comparison between PAL and SRL.

Clinical staffs and residents were positive toward teaching medical students and perceived this task as one of their major responsibilities; however, due to lack of teaching skills and time constraint limited them from this task[16]. On the other hand, some staffs and especially some residents perceived themselves as more a clinician than teacher; thus, teaching medical students fall to lower priorities[17]. As a result, medical students have to adapt their learning style, social behavior and environment in order to be successful in education and professionalism in clinical settings.

Table 1 General characteristics of clinical-years medical students of Phramongkutklao College of Medicine according to their clinical years

Characteristics	Clinical year		
	Fourth n (%)	**Fifth n (%)**	**Sixth n (%)**
Genders			
Male	32 (22.535%)	30 (21.127%)	11 (7.746%)
Female	31 (21.831%)	29 (20.423%)	9 (6.338%)
GPA			
2.00-2.49 (C)	1 (0.704%)	1 (0.704%)	1 (0.704%)
2.50-2.99 (C+)	11 (7.746%)	18 (12.676%)	5 (3.521%)
3.00-3.49 (B)	36 (25.352%)	22 (15.493%)	6 (4.225%)
Above 3.50 (B+ and A)	15 (10.563%)	18 (12.676%)	8 (5.634%)

Table 2 Mean score and factor loadings of each aspect of perspective toward PAL and SRL

Students' perspectives	Learning methods	Mean ± SD	Factor loadings (λ)
Perspectives toward knowledge acquired	PAL	3.585 ± 0.969	0.707
	SRL	3.923 ± 0.859	0.799
Perspectives toward active learning stimulation	PAL	3.669 ± 1.009	0.658
	SRL	4.120 ± 1.028	0.781
Perspectives toward learning environment	PAL	3.366 ± 1.307	0.632
	SRL	3.148 ± 1.321	0.809
Perspectives toward clinical skills acquired	PAL	3.592 ± 0.976	0.717
	SRL	3.401 ± 1.045	0.521
Perspectives toward time consumption	PAL	3.078 ± 1.130	0.858
	SRL	2.197 ± 1.279	0.703
Perspectives toward accuracy of information	PAL	3.268 ± 0.883	0.784
	SRL	3.711 ± 0.822	0.783

In earlier studies, learner-centered curriculum, which students have to manage their own learning strategies, enhanced psychomotor, cognitive and metacognitive awareness as well as self-regulated learning skills[11, 12, 18]. SRL also developed critical thinking skill, elaborating learning strategies and task value[19]. Moreover, SRL is a learning method that required active students to take charge of their own learning strategies[10] and clinical context education is a complex, flexible and authentic situations, as a result, active learning is a required quality of clinical-years medical students[20]. This approach of learning method always supports the goal for 'lifelong learning' and thus, SRL was valued by medical students.

There was an interesting point in which most students' perspectives focused on learning environment in SRL. It can be implied that in this context, learning environment was more comfortable and favorable for individual learning although previous study indicated that in PAL, students help each other to learn and feeling more relaxed and comfortable[21, 22]. In previous study in medical schools in Thailand, one of the major stressors to Thai medical students was learning competition[23]. Thus, it could be concluded that in this setting, underneath the friendly and helpful learning environment among peers, many students felt inferior or superior to others and competition was inevitable. It is suggested that gaps between grading systems should be decreased and empathy as well as respect toward peers should be implemented.

In the aspect of clinical skills learning, students' attitudes toward PAL was high which could be interpreted that students were highly concern about this aspect in PAL. This could be attributed to the fact that clinical skills required audiovisual interactions in order to practice the procedures from others[4]. Learning clinical skills with peers were perceived as comfortable and also developing confidence among peer-learners[22]. In addition, peer-teachers can benefit in deeper level of understanding from PAL[22]. From these evidences, this study suggested a concept of senior peers teaching clinical skills to junior peers under supervision from staffs or residents in order to enhance confidence and agility to senior and develop clinical skills to junior peers as well as fostering good relationship between seniors and juniors. On the other hand, PAL was seemed to had greater effect to time consumption than SRL. This might be due to different levels of knowledge between peer-learners of which peer-teachers might have to slowly tutoring in order to allow everyone in the group to catch up with the lesson. Also, discussion occurs in PAL[24], as a result, discussion among peers could prolong the tutoring, thus, consuming more time than learning individually.

Both SRL and PAL had high impact factors toward perspectives regarding accuracy of information. In a previous study, among peer-learners, they felt that information form peer-teachers were valuable because the information was believable, relevant and useful[21]. However, in this study, the similar results could be resulted from their perception that both peer-teachers and peer-learners were in the same level and the information acquired from peers were not different from learning by their own.

There was a limitation of this study as most sixth-year students were absence from data collection due to rotating outside of Phramongkutklao Hospital. As, the data of this study were used for further quantitative studies, there were constraint time for collecting responses from all sixth-year students. Perceptions of sixth-year students could be different

from their juniors due to their work, responsibilities and experiences. Other means of assessing outcomes from Peer-teaching and self-learning other than using perspectives could be done in order to yielded results from various aspects for promotion of peer-teaching and self-learning effectiveness.

Recommendations for further studies were explorations into aspects with high impact factors. Focus groups interview and mean comparison were recommended for comparing students' perspectives toward PAL and SRL.

It was concluded that both PAL and SRL were beneficial in different aspects. Both methods should be encouraged simultaneously with traditional clinical learning in order to promote successful learning outcomes for medical students.

Acknowledgement

We would like to thanks all participants for contributing this valuable information for further development of the curriculum. We must also thank the crews of Medical Education Unit, Phramongkutklao College of Medicine for facilitate the processes of this study.

References

1. Thistlethwaite JE, Davies D, Ekeocha S, Kidd JM, MacDougall C, Matthews P, et al. The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. Med Teach. 2012;34(6):e421-e44.
2. Williams B. Case based learning—a review of the literature: is there scope for this educational paradigm in prehospital education? Emerg Med J. 2005;22(8):577-81.
3. El-Masry R, Ghreiz SM, Helal RM, Audeh AM, Shams T. Perceived stress and burnout among medical students during the clinical period of their education. Ibnosina J Med Biomed Sci. 2013;5(4):179-87.
4. Kantiwong A, Charoensakulchai S. What Learning Resource Persons do Clinical Medical Students Prefer? MedEdPublish. 2018;7.
5. Flexner A. Medical education in the United States and Canada. Bull World Health Organ. 2002;80:594-602.
6. Peterson MW, Rowat J, Kreiter C, Mandel J. Medical students' use of information resources: Is the digital age dawning? Acad Med. 2004;79(1):89-95.
7. Henning JM, Weidner TG, Marty MC. Peer assisted learning in clinical education: Literature review. Athletic Training Education Journal. 2008;3(3):84-90.
8. Silbert BI, Lake FR. Peer-assisted learning in teaching clinical examination to junior medical students. Med Teach. 2012;34(5):392-7.
9. Furmedge DS, Iwata K, Gill D. Peer-assisted learning–Beyond teaching: How can medical students contribute to the undergraduate curriculum? Med Teach. 2014;36(9):812-7.
10. Berkhout JJ, Helmich E, Teunissen PW, van der Vleuten CP, Jaarsma ADC. How clinical medical students perceive others to influence their self-regulated learning. Med Educ. 2017;51(3):269-79.

11. Brydges R, Carnahan H, Safir O, Dubrowski A. How effective is self-guided learning of clinical technical skills? It's all about process. Med Educ. 2009;43(6):507-15.
12. Kuiper RA, Pesut DJ. Promoting cognitive and metacognitive reflective reasoning skills in nursing practice: self-regulated learning theory. J Adv Nurs. 2004;45(4):381-91.
13. Dornan T, Hadfield J, Brown M, Boshuizen H, Scherpbier A. How can medical students learn in a self-directed way in the clinical environment? Design-based research. Med Educ. 2005;39(4):356-64.
14. Charoensakulchai S, Kantiwong A, Piyaraj P. Factors Influencing Problem-Based Learning: Students' and Teachers' Perspectives. MedEdPublish. 2019;8.
15. Tabachnick BG, Fidell LS, Ullman JB. Using multivariate statistics: Pearson Boston, MA; 2007.
16. Busari JO, Prince KJ, Scherpbier AJ, Vleuten CPvd, Essed GG. How residents perceive their teaching role in the clinical setting: a qualitative study. Med Teach. 2002;24(1): 57-61.
17. O. Busari AJS, Cees PM Van Der Vleuten, Gerard E. Essed, Jamiu. Residents' perception of their role in teaching undergraduate students in the clinical setting. Med Teach. 2000;22(4):348-53.
18. Turan S, Demirel O, Sayek I. Metacognitive awareness and self-regulated learning skills of medical students in different medical curricula. Med Teach. 2009;31(10):e477-e83.
19. Sungur S, Tekkaya C. Effects of problem-based learning and traditional instruction on self-regulated learning. The journal of educational research. 2006;99(5):307-20.
20. Berkhout JJ, Helmich E, Teunissen PW, van der Vleuten CP, Jaarsma ADC. Context matters when striving to promote active and lifelong learning in medical education. Med Educ. 2018;52(1):34-44.
21. Glynn LG, MacFarlane A, Kelly M, Cantillon P, Murphy AW. Helping each other to learn–a process evaluation of peer assisted learning. BMC Med Educ. 2006;6(1):18.
22. Nicky Hudson J, Tonkin AL. Clinical skills education: outcomes of relationships between junior medical students, senior peers and simulated patients. Med Educ. 2008;42(9): 901-8.
23. Saipanish R. Stress among medical students in a Thai medical school. Med Teach. 2003;25(5):502-6.
24. Bennett D, O'Flynn S, Kelly M. Peer assisted learning in the clinical setting: an activity systems analysis. Advances in health sciences education. 2015;20(3):595-610.