Research Journal of Medical Sciences 7 (1): 20-24, 2013
ISSN: 1815-9346

Self Directed Learning (Problem Based Approach) in the Integrated Curriculum of King Abdulaziz University, Perception and Practice of Medical Students: A Comparative Cross-Sectional Study

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Abstract: In 2007, KAU started implementing the new curriculum in which several teaching strategies were included such as Problem Based Learning (PBL). This study aims to assess the student perception regarding the current PBL process used in the integrated curriculum at the faculty of medicine in King Abdulaziz University as well as a private college in Jeddah, Saudi Arabia. The highest perception among student was that PBL promotes discussion and asking questions, followed by high perception of the student that PBL motivate them to attend regularly. The mean perception of the students towards role of PBL in integrating different discipline and helping the students to be independent learner were the same. The student perceived that the role of tutor is essential in PBL success. The student perceived that the role of both library and internet in helping them to find resources of PBL was incomplete. The student perceived that PBL helped them to solve problems than traditional lecture. Finally, students perceived that PBL consume a lot of time in searching for knowledge.

Key words: Teaching, Problem Based Learning (PBL), students, process, perception

INTRODUCTION

Problem Based learning (PBL) was first developed by Howard Barrows at McMaster University in Canada in the mid 1960's. According to Chakravarty *et al.* (2005) PBL is a method of teaching that uses hypothetical clinical cases, individual investigation and group process. Among many of its advantages PBL allows students to learn by applying processes of reasoning rather than by memorization of facts. Since, its genesis, this teaching method has been the subject of considerable interest and debate. In recent years, in medical education, PBL has increasingly been adopted as the preferred pedagogy in many countries around the world.

It is only in the year 2007 that the Faculty of Medicine King Abdulaziz University KAU (FOM) started implementing the new curriculum which included several teaching strategies were used such as lectures, PBL, practical sessions, clinical teaching, Student Directed Learning (SDL), early clinical exposure and communication skills.

Basic knowledge was introduced in the disciplines during the first semester of the second year while integration of the concepts was planned through PBL during the second semester of the 2nd year and throughout the 3rd year.

In the second semester of the 2nd year five modules are conducted in the 2nd year and 4 in the 3rd year. The modules conducted in the 2nd year are: musculoskeletal module, cardiovascular module, immune, blood and lymphatic system module, respiratory module and urinary module. In the 3rd year the modules are: Gastrointestinal module, nervous system and special senses module, endocrine module and reproductive module.

Each module has one PBL case that lasts throughout four sessions where each session is of 2 h duration. The sessions involve discussions in small groups (10 students), contextual learning, integration of knowledge and emphasis on patient problems, According to Dolmans and Schmidt (1996) the prior approach have several cognitive effects on student learning. These effects are increased retention of knowledge, enhancement of integration of basic science concepts into clinical problems, the development of self-directed learning skills and the enhancement of students intrinsic interest in the subject matter.

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PBL has a fairly short history in KAU and any form of feedback will greatly enhance and rectify the process so feedback was sought from different areas. There are no better people to give us feedback on the PBL process that the people who are heavily involved in it, the students. Through obtaining the students feedback researchers will be able to recognize areas of deficiency and work on its improvement. It will also enable the students to build their attitudes and ability to self assessment. The students will have ownership in the PBL program and will feel that their voices are heard and their opinions are valued. This study aimed to assess the 2nd, 3rd, 4th and 5th years students' perception of the PBL process after participating in the courses of integrated modules.

MATERIALS AND METHODS

A cross sectional study was conducted in the Faculty of Medicine at King Abdul-Aziz University, Jeddah, Saudi Arabia. During the academic year 2011 to 2012, the data was collected from a self-administered structured questionnaire. The study subjects were 3rd, 4th, 5th and 6th years under-graduate medical students who experienced PBL through at least nine modules. The questionnaire was distributed and collected at the end of year through group leaders where participation in the study was optional. Ethics approval was granted from FOM-KAU Ethics committee.

To ensure face validity of the tool of the study, pilot study was conducted among 24 students from different years. The result of those questionnaires was not included in the final results. The questionnaire was given to five professors at King Abdulaziz, University Faculty of Medicine to revise and modify it.

The questionnaire consisted of 16 statements regarding the assessment of PBL process. The students were asked to indicate agreement on a five point Likert scale where five was strongly agree with the statement and one was strongly disagree with the statement. The questionnaire was first designed in English and then translated in Arabic. To ensure validity a double translation was also done. The reliability of the questionnaire was studied by alpha cronbach, it equals 0.82.

The data was entered and analyzed using Statistical Package for Social Science (SPSS). The quantitative data were presented in the forms of means and standard deviations. One way analysis of variance (F-test) was done to compare between groups followed by post hoc test benferroni test. Student t-test was used for comparison between two groups (male and female).

Pearson correlation coefficient was done to study correlation between variables significant was considered at $p<0.05$.

RESULTS AND DISCUSSION

Table 1 showed number and percentage of student who agreed to participate in this study according to gender. The total number of student was 720 including 379 (52.6) males and 341 (47.4) female. Students from 3rd, 4th, 5th and 6th years participated in the study. No significant difference was detected between different years regarding participation of both male and female student in the study.

Table 2 showed some character of students who participated in this study. The study included 148, 160, 202 and 210 from 3rd, 4th, 5th and 6th year, respectively. The number in each year was nearly equally distributed between males and female student. The half of the student had GBA of good, regarding number of PBL cases they attended during their study about four of them attended from four to six PBL cases, another fourth of them attended more than six PBL cases.

Table 3 showed perception of the student toward problem based learning at King Abdulaziz University, Faculty of Medicine. The highest perception among student was that PBL promotes discussion and asking

Table 1: Number and percentage of student in each year according to gender at King Abdulaziz University, Faculty of Medicine

	Males		Females		
Years	N	%	N	%	Total (N)
3rd	82	55.4	66	44.6	148
4th	76	47.5	84	52.5	160
5th	102	50.5	100	49.5	202
6th	119	56.7	91	43.3	210
Total	379	52.6	341	47.4	720

Table 2: Some character of the studied student at King Abdulaziz University, Faculty of Medicine

Characteristics	N	%
Years		
3rd	148	20.6
4th	160	22.2
5th	202	28.1
6th	210	29.2
Gender		
Male	379	52.6
Female	341	47.4
GBA		
Excellent	21	2.9
Very good	144	20.0
Good	373	51.8
Accepted	182	25.3
Number of cases		
<2	44	13.1
2-4	273	37.9
4-6	183	25.4
6 and more	170	23.6

questions 4.18±0.85 followed by high perception of the student that PBL motivate them to attend regularly 4.06±0.94. The mean perception of the student that PBL helped them to be confident during discussion is 4.03±0.86. The mean perception of the students towards role of PBL in integrating different discipline and helping the students to be independent learner were the same 4.01±0.9. The student perceived that the role of tutor is essential in PBL success 3.97±0.94. The student perceived that the role of both library and internet in helping them to find resources of PBL was not complete. The student perceived that PBL helped them to solve problem than traditional lecture 3.88±0.96 also, they perceived that PBL consume a lot of time in searching the knowledge 3.61±0.99.

Table 4 showed comparison between different years regarding perception towards PBL. The 3rd year student perceived significantly that student of 4th and 6th year that PBL motivate them to attend regularly. Fourth student perceived significantly that PBL help to integrate between different discipline than students of 3rd year. Student of 3rd year perceived significantly than 4th year students Evaluation during PBL help me to promote my academic performance and score in PBL reflect my academic performance. The 3rd year students perceived significantly that PBL consume a lot of time in searching the knowledge than 6 year students. The 3rd year students perceived significantly that PBL resources are available at the library and PBL is only who modulate the discussion than 4th, 5th and 6 year students.

Table 5 showed comparison between student regarding perception of PBL according to gender. Female students significantly perceived than male students regarding PBL motivates me to attend regularly, PBL help to integrate between different discipline, PBL promotes discussion and asking questions, my score in PBL reflect my academic performance and PBL consume a lot of time in searching the knowledge. Male students significantly perceived than female students regarding PBL tutor is only who modulate the discussion.

In this study, majority of the male and females students who attended PBL sessions gave a positive perception of PBL. This finding is similar to perception reported in other studies. Suleman *et al.* (2010) published a study of the perception of 4th year medical students and reported that PBL was perceived as a better learning method.

In this study, the ability to think before asking questions was also rated as a positive and statistically significant perception among both female and male students. The statement thinks before talking reflects the active learning the students are undergoing during a PBL session. Bonwell and Eison (2001) defined active learning as any instructional method that engages students in the learning process. Active learning requires students to do

Table 3: Perception of the student toward problem based learning at King Abdulaziz University, Faculty of Medicine

Perception	Mean±SD
PBL motivates me to attend regularly	4.06±0.94
PBL help to integrate between different discipline	4.01±0.90
PBL promotes discussion and asking questions	4.18±0.85
PBL helps co-operation and promotion of production among the students groups	3.95±0.85
PBL helps me to be independent learner	4.01±0.91
PBL trains me to think before asking questions	3.90±0.87
PBL help me to be confident during discussion	4.03±0.86
PBL help me to solve problem than traditional lecture	3.88±0.96
Evaluation during PBL help me to promote my academic performance	3.71±1.01
My score in PBL reflect my academic performance	3.43±1.12
PBL cases was written well and promote knowledge	3.61±0.99
PBL consume a lot of time in searching the knowledge	3.81±0.98
PBL resources are available at the library	3.39±1.05
PBL resources are available at the internet	3.76±0.97
PBL tutor is essential for PBL success	3.97±0.94
PBL tutor is only who modulate the discussion	3.00±0.15

Table 4: Comparison between different years regarding perception towards PBL

Perception	3rd year	4th year	5th year	6th year
PBL motivates me to attend regularly	4.31±0.93	3.83±0.90***	4.09±0.97	4.01±0.91*
PBL help to integrate between different discipline	3.93±0.92	3.97±0.94	4.22±0.85*	3.99±0.84
PBL promotes discussion and asking questions	4.31±0.81	4.08±0.71	4.29±0.97	4.11±0.87
PBL helps co-operation and promotion of production among the students groups	4.02±0.91	3.86±0.77	3.95±0.83	3.99±0.88
PBL helps me to be independent learner	4.13±0.95	3.91±0.81	4.07±0.87	3.95±0.96
PBL trains me to think before asking questions	3.93±0.89	3.83±0.79	4.01±0.87	4.11±0.84
PBL help me to be confident during discussion	4.03±0.94	3.96±0.79	4.01±0.87	4.11±0.84
PBL help me to solve problem than traditional lecture	3.97±0.87	3.73±0.99	3.86±0.97	3.94±0.99
Evaluation during PBL help me to promote my academic performance	3.85±1.06	3.53±0.98*	3.63±1.03	3.83±0.95
My score in PBL reflect my academic performance	3.52±1.11	3.11±1.14*	3.41±1.08	3.64±1.09
PBL cases was written well and promote knowledge	3.75±1.08	3.84±0.99	3.5±1.030	3.73±0.86
PBL consume a lot of time in searching the knowledge	3.87±1.05	3.86±0.93	3.97±0.93	3.58±0.99*
PBL resources are available at the library	3.75±1.12	3.27±0.97***	3.25±1.05***	3.38±1.01***
PBL resources are available at the internet	3.85±0.93	3.73±0.97	3.76±0.99	3.73±0.99
PBL tutor is essential for PBL success	4.06±0.92	3.83±0.95	3.87±0.99	3.99±0.90
PBL is only who modulate the discussion	3.95±1.06	2.94±1.02***	2.93±1.13***	2.68±1.16***

Mean±SD represents the ±values

Table 5: Comparison between student regarding perception of PBL according to gender

Perception	Males (Mean±SD)	Females (Mean±SD)	p-value
PBL motivates me to attend regularly	3.98±1.01	4.1±0.8600	0.035*
PBLhelp to integrate between different discipline	3.88±0.94	4.12±0.830	<0.001***
PBL promotes discussion and asking questions	4.09±0.89	4.29±0.800	0.002***
PBL helps co-operation and promotion of production among the students groups	3.95±0.85	3.96±0.860	0.81
PBL helps me to be independent learner	3.99±0.95	4.04±0.850	0.67
PBL trains me to think before asking questions	3.87±0.91	3.93±0.870	0.33
PBL help me to be confident during discussion	3.66±1.03	3.76±0.990	0.108
PBL help me to solve problem than traditional lecture	3.38±1.11	3.48±1.130	0.23
Evaluation during PBL help me to promote my academic performance	3.64±0.94	3.58±1.040	0.41
My score in PBL reflect my academic performance	3.68±1.03	3.96±0.910	<0.001***
PBL cases was written well and promote knowledge	3.46±1.06	3.31±0.103	0.41
PBL consume a lot of time in searching the knowledge	3.68±1.03	3.96±0.910	<0.001***
PBL resources are available at the library	3.64±1.06	3.31±0.103	0.057
PBL resources are available at the internet	3.77±0.98	3.74±0.970	0.687
PBL tutor is essential for PBL success	3.92±0.89	3.94±1.080	0.76
PBL tutor is only who modulate the discussion	3.22±1.13	2.75±1.170	<0.001***

meaningful learning activities and think about what they are doing. It is important to specify that the active learning referred to in this study is the student activity and engagement in the learning process.

Student perception regarding the time needed to prepare for the PBL sessions was also positive and statistically significant for both male and female students. In PBL, students are encouraged to take responsibility for their own self-regulated learning process. In 2006, a study by Van Den Hurk (2006) showed that students who are better time-planners and who have better self-monitoring skills were more efficient in allocating their individual study time (spent less time on individual study), prepared more appropriately for the tutorial group meeting and achieved higher scores on cognitive tests. Research is further needed to assess the students in KAU and their time planning and self-monitoring skills. This research will be helpful to also give us insight on the available resources in both the library and access to the internet and will help us investigate how time planning and self-monitoring skills are related to actual individual study time, participation levels in the tutorial group and their cognitive achievement.

This study showed that the students positively rated the PBL ability to stimulate critical thinking and asking questions building confidence. These findings are 0 consistent with what was reported in the literature describing the methods used in PBL and the specific skills developed including the ability to think critically, analyze and solve complex, real-world problems, to find, evaluate and use appropriate learning resources to work cooperatively, to demonstrate effective communication skills and to use content knowledge and 3rd intellectual skills to become continual learners (Duch *et al*., 2001).

This study revealed that third year student perceived significantly that student of 4th and 6 year that PBL motivate them to attend regularly. Students might have been able to see the effect of attendance on their participation level during PBL sessions.

Both female and male students had a positive perception though regarding the role of PBL in integration between different disciplines it was not statistically significant. PBL is generally introduced in the context of a defined core curriculum and integration of basic and clinical sciences. Presentation of clinical material as the stimulus for learning enables students to understand the relevance of underlying scientific knowledge and principles in clinical practice. Foley *et al.* (1997) have drawn attention to the absence of reports of PBL in the clinical years. They suggested that there has been an abundant flow of information written about problem-based curricula in the basic sciences and few in the clinical sciences. Later, Steinert (2004) investigated students' perceptions about effective small group teaching and found that students emphasized the importance of clinical relevance of problems and that they appreciate tutors who expanded the problem to another clinical situation. One of the major goals of following a system based curriculum at KAU is to allow interdisciplinary integration yet there is no published research on the description of existing KAU curriculum. Further investigation to assess student perception and involvement in KAU curriculum are strongly needed.

The only area for improvement was the availability of physical resources. Students did not agree that the available resources at the library were easily accessed. This finding is consistent with a study done by Khoo (2001) where information was gathered on the reactions of both staff and students after the actual implementation of PBL in their curriculum in the National University of Singapore. He reported lack of physical resources as one of the difficulties.

Inability of the students to access resources has a crucial impact, since information-seeking skills is central to any PBL curriculum. Rankin (1992) conducted a study exploring the relationship between PBL curriculum, student information and library use. He found that there is a significant difference ($p<0.05$) between PBL and

conventional curriculum students, suggesting that PBL students were the more frequent library users used information resources that supported the independent learning process, acquired information-seeking skills at an earlier stage in their medical education and reported greater ease in using these skills. This current study was conducted in during the academic year 2011 to 2012. The Faculty of Medicine at KAU was very keen to update its library resources.

The tutors effect on the success of PBL sessions was positive and statistically significant ($p<0.05$) but before addressing the student perception regarding the tutors role in PBL, researchers have to acknowledge that the students filled the questionnaire away from the tutors. Thus, the tutors did not have any influence on the student's answers. PBL tutors contribute greatly to the learning process. Dolmans *et al*. (2005) summarized the behaviors as the tutors should work toward ensuring a successful small group interaction. They stated that tutors stimulates active learning by asking students to summarize in their own words what they have learnt and by encouraging students to find connections between the issues they have studied. It would be interesting to conduct further research and identify the existing behaviors that tutors demonstrate in KAU and compare it to the behaviors named in Dolman's research.

CONCLUSION

The overall perception students at KAU of PBL were positive. The results showed positive effect on their attendance, ability to integrate among disciplines and their asking questions. The results suggest further researches on how students' PBL experience at KAU might be enhanced and on certain areas that need improvement. Focus group discussion with the student from different years might be carried out last but not least is the need to insure the availability and accessibility of adequate facilities and resources to students.

ACKNOWLEDGEMENTS

This project was funded by the Deanship of Scientific Research (DSR), King Abdulaziz University, Jeddah under grant No. (373/140/1431). The researchers therefore, acknowledge with thanks DSR technical and financial support.

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