

Medical Students' Perception towards Recently Introduced Problem-Based Learning in Surgery Module: A Case of University of Ha'il

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ABSTRACT

Background: In literature, problem-based learning is repeatedly conveyed in relation to medical basic sciences. It has been introduced in the syllabus of the surgery module very recently.

Aim: To assess students' perceptions towards PBL in the clinical years course of their medical study, in a surgery module.

Methods: A cohort study involves the 6th year students (academic year, 2019-2020) in their surgical course at the end of the newly introduced PBL sessions using a self-administered validated questionnaire. Their responses to close questions had been recorded using a Likert scale. The collected data and their open feedback were analyzed using SPSS version 21.

Results: A-80 participants were responded to the questionnaire (male = 46 [57.5%], female = 34 [42.5%]). Their perception of PBL in the surgery module was more positive than negative. Results recognized that student's perceptions were positive towards the pinpoints of the PBL, precisely in the issues concerned with working in groups, critical thinking and self-learning skills. More than 63% of the participants supposed that the PBL must be preserved as part of the surgery module. However, the number of students who had a negative perception towards PBL process overall was not negligible.

Conclusion: PBL is palatable by students, so, it is encouraging to continue adapting this method of learning in the surgery module.

Keywords: Conventional teaching methods (CTM); Problem based learning (PBL); Student's perception; Surgery module.

INTRODUCTION

Conventionally, a lecture-based approach has been used to disseminate academic knowledge in medical institutes, though its effectiveness has been questioned¹. The deficiencies perceived in conventional teaching methods (CTM) of teaching and learning has led to the development and implementation of more effective methods appropriate to a given situation. Now trends in medical education have shifted from didactic teaching to problem-based learning (PBL), for enhancing the learning process and increasing professional competence².

PBL is a student- pivoted educational procedure initially announced in the sixties of the last century by Howard S Barrows and his colleagues, following his research at McMaster University in Hamilton, Ontario, Canada. Its purpose was to train students to think critically and settle problems in order to take greater liability for their own learning, as well as to increase enthusiasm and satisfaction. These students can produce more truthful, reliable, and inclusive explanations than those utilizing conventional learning methods³.

In its process, small student groups are approached with contextual events and they are required to determine the problem, what tactics and materials are required to discuss the case and to come up with probable outcomes⁴. The tutor or instructor is a part of the PBL session in

facilitating the group discussion to the requisite depth ensuring active learning⁵. Different studies concluded that PBL never simply facilitates learners gaining knowledge only, rather, it enhances students' capacity to address complicated issues, integrates their knowledge with basic science, encourages them to pursue knowledge acquisition, and strengthens their teamwork, peer instruction, and self-attention. It makes them able to assess their capabilities^{6,7}.

To our knowledge this study is the first study in KSA testing the student's perception towards the newly applied PBL in the syllabus of the surgery module. We hypothesized that problem-based learning is palatable by the students in their surgery module. So, this study aimed to assess the student's perception towards problem-based learning at its commencement as a new tool applied in the syllabus of the surgery module and to compare the effects of PBL and CTM on improving the medical educational environment.

MATERIALS AND METHODS

A cohort study was conducted in the College of Medicine, University of Hail, Saudi Arabia. Medical students in the 12th semester in the surgery module had been requested to voluntarily contribute to the current project at the end of the third PBL, a new introduced to the curriculum in the academic year 2019-2020. Students at this level have an

acceptable capability and expertise with PBL process, because they were studied in this way while in the preclinical stage of the undergraduate medical curriculum.

As PBL had newly introduced in the surgery module, it is pertinent to know how satisfied the students are with this newly launched teaching method. Furthermore, the wider introduction of novel learning methods such as PBL is likely to be more successful and persuasive if learners are convinced.

Before conducting the study, ethical approval had been obtained from the Human Research Ethical Committee of College Medicine, University of Hail, Saudi Arabia (HREC00097/ CM -UOH.02/20). The students were divided into 8 small groups, as a result every group comprised of 10 to 11 learners.

The PBL method comprises three sessions of teamwork. In the premier session the students identify the relevant learning issues, while the facilitator is the situation monitor. The group leader determined by students deals with the medical problem and reads it to all group members in 5 minutes. Then, all not lucid points and meanings in the scenario are clarified in another 5 minutes.

Following that, the student uses brain storming to solve the information and hints and key words, and to suggest a general solution in 15 minutes. Student should finally develop learning goals from the scenario in 30 minutes.

Students conduct search and collect information on the learning topics identified in the first session, and then they convene in the second session to display information and discuss learning issues.

In the third session of the PBL, all groups coalesce and present their task in the presence of all facilitators. After completion of PBL scenarios over a period of three successive weeks the study was conducted while the students were still in the seminar room.

In the beginning, the researchers briefly clarified the goals of the current study, as well as the voluntary nature of participation that would have no effect on their exam results.

All students that did not attend a total of 66.7% of the PBLs, as well as those not express an interest in participating and didn't sign the consent form, were excluded.

The study was conducted by distribution of the pre-designed questionnaire along with informed consent to the students. A questionnaire was developed by authors; it was compiled using ideas and questions from various qualitative studies. It is anchored on the fundamental elements and learning strategies of PBL that were earlier validated in previous studies with slight modifications according to the objective of the current study^{8,9}. It is comprised of 22 closed questions related to PBL methods with 5-point Likert-scaled agreement questions.

The response scale is translated in this way: 5 and 4 were equivalents to the replay of strongly agree, and agree respectively, 3 were equivalents to not decided, whereas 2 and 1 were equivalents to disagree, and strongly disagree respectively. A mean score above 3 showed a positive perception towards learning, whereas a mean score equal or less than 3 showed a negative perception.

Initially the questionnaire had been piloted and shared randomly with 10 learners for its validation for use. Then after, students were requested to reply to the validated questionnaire.

The gathered data was entered into an EXCEL master sheet, and then imported into SPSS version 25.0. The quantitative data had been expressed as mean and standard deviation. Whereas, the qualitative data were shown as a percentage, and matched between groups by Chi square test. P-values of less than 0.05 are considered significant (95% CI).

Ethics statement: The researchers are responsible for the entire features of this study in order to make sure that questions allied to the precision or reliability of every section of this venture are properly studied and it has been resolved, and fixed when appropriate. All of the measures for this study were rigorously organized with the approval of the Human ethical committee, University of Hail (HREC 00107/CM-UOH.04/20). Informed consent was signed by all participants.

RESULTS

Eighty students were replied appropriately with a contribution rate of 95.2% (Males=46 and females= 34). Male to female ratio was 1.2:1.

Attitudes towards group work: The majority of the students enthusiastically contributed in the group discussions, nonetheless there were as yet some learners use to be soundless. When interviewed personally, part of them state that they don't prefer to converse until they grasp a higher degree of knowledge. Whereas, the reminders did not accept the PBL and preferred the CTM.

The collection to view their insights and attitudes towards group work was formed by seven questions. Questions enquired were; (i) their preference to work in groups, (ii) BPL improve contribution to team work, (iii) BPL enhances communication between learners, (iv) BPL aids collaboration between the learners, (v) BPL improves the ability of organization and cooperation, (vi) BPL influence self-confidence, and (vii) BPL evaluate the contribution by other team members.

Student responses had positive affiliation with their preference to work in groups (mean scores 4.34 ± 1.76) ($P=0.003$), it improves contribution to team work (mean scores 3.64 ± 1.62) ($P=0.64$), it enhances communication between learners (mean scores 4.56 ± 1.71) ($P=0.07$), it aids collaboration between the learners (mean scores 4.69 ± 1.70) ($P=0.02$). it improves the ability of organization and cooperation (mean scores 4.35 ± 1.63) ($P=0.06$), it influences self-confidence (mean scores 4.99 ± 1.74) ($P=0.0009$), and it improves contribution to team work (mean scores 3.17 ± 1.68) ($P=0.1$) (Table 1).

Learning objectives: This set encompassed 6 questions covering perceptions of whether learners have worthy thought of the learning purposes and whether they faith that they have come to be experienced at the learning objectives. Generally, the majority of students had demonstrated a positive perception as they agreed that PBL improves problem analysis and solving skills (mean scores, 4.10 ± 1.78) ($P=0.007$) as well as it improves skills in inter relating concepts (mean scores, 4.14 ± 1.49) ($P=0.009$).

Table 1: Student responses to group work

Student's Feedback on group work	Gender	Positive response	Mean±SD	P value
Students prefer to work in group	Male	25 (31.25%)	4.00±1.81	0.003
	Female	25 (31.25%)	4.79±1.59	
	Total	50 (62.5%)	4.34±1.76	
Assess and improve contribution to team work	Male	26 (32.5%)	4.54±1.68	0.64
	Female	16 (20%)	4.76±1.56	
	Total	42 (52.5%)	4.64±1.62	
Enhance communication between learners	Male	20 (25%)	4.37±1.68	0.07
	Female	22 (27.5%)	4.82±1.75	
	Total	42 (52.5%)	4.56±1.71	
Collaboration between the learners	Male	25 (31.25%)	4.67±1.69	0.02
	Female	19 (23.75%)	4.71±1.75	
	Total	44 (55%)	4.69±1.70	
Improve the ability of organization and cooperation	Male	24 (30%)	4.44±1.67	0.06
	Female	19 (23.75%)	4.24±1.60	
	Total	43 (53.75%)	4.35±1.63	
Influence the self confidence	Male	26 (32.5%)	5.18±1.75	0.0009
	Female	25 (31.25%)	4.76±1.71	
	Total	51 (63.75%)	4.99±1.74	
Evaluate the contribution by other team members	Male	23 (28.75%)	3.37±1.69	0.1
	Female	21 (26.25%)	2.91±1.66	
	Total	44 (55%)	3.17±1.68	

Table 2: Student responses to establishing learning objectives

Student's Feedback on group work	Gender	Positive response	Mean±SD	P value
Problem analysis and solving skills	Male	28 (35%)	3.56±1.87	0.007
	Female	21 (26.25%)	4.88±1.66	
	Total	49 (61.25%)	4.10±1.78	
Find and set learning goals	Male	14 (17.5%)	2.83±1.59	0.92
	Female	6 (7.5%)	2.29±1.47	
	Total	20 (25%)	2.60±1.56	
Improve the learner's interest and learning enthusiasm	Male	14 (17.5%)	2.87±1.47	0.69
	Female	12 (15%)	2.74±1.44	
	Total	26 (32.5%)	2.81±1.45	
Improve skills in inter relating concept	Male	27 (33.75%)	4.28±1.52	0.009
	Female	24 (30%)	3.94±1.45	
	Total	51 (63.75%)	4.14±1.49	
Not being sure of the extent of what to learn	Male	26 (32.5%)	4.06±2.06	0.005
	Female	28 (35%)	5.15±1.67	
	Total	54 (67.5%)	4.52±1.97	
Needs longer learning time	Male	37 (46.25%)	4.11±1.92	0.003
	Female	28 (35%)	5.44±1.08	
	Total	65 (81.25%)	4.67±1.74	

On the other hand, they had negative responses in regards to it helps to find and set learning goals (mean scores, 2.60±1.56) (P=0.92), it improves the learner's interest and learning enthusiasm (mean, 2.81±1.45) (P=0.69), when they asked about the extent of what to learn the majority replied that they are not being sure of the extent of what to learn (mean score, 4.52±1.97) (P=0.005), in similar way the mentioned it needs longer learning time (mean, 4.67±1.74) (P=0.003) (Table 2).

Improvement of the self-learning ability: As displayed in Table 3, the majority (5 out of 8 (62.5%)) of the respondents expressed positive views in this regard. The learners indicated that PBL improved their ability to self-study (mean, 4.84±1.80) (P=0.01) and their ability to search and organize literature (mean, 4.17±1.76) (P=0.009). Similarly, they indicated that it improved their ability to summarize the concept they learned (mean, 3.53±1.70) (P=0.09), it enabled them to evaluate and improve their skills as independent learners (mean, 3.47±1.61) (P=0.6), and it improved their critical thinking skills (mean, 4.47±1.73) (P=0.02).

Table 3: Self-directed learning

PBL it	Gender	Positive response	Mean±SD	P value
Enhances self-learning ability	Male	26 (32.5%)	4.87±1.73	0.01
	Female	19 (23.75%)	4.79±1.92	
	Total	45 (56.25%)	4.84±1.80	
Improves literature search and arrangement ability	Male	29 (36.25%)	4.28±1.82	0.009
	Female	22 (27.5%)	4.03±1.70	
	Total	51 (63.75%)	4.17±1.76	
Summarizes the concept that learnt	Male	27 (33.75%)	3.15±1.65	0.09
	Female	24 (30%)	3.82±1.78	
	Total	51 (63.75%)	3.53±1.70	
Structures the concepts and ideas discussed	Male	20 (25%)	2.15±1.79	0.09
	Female	6 (7.5%)	2.56±1.62	
	Total	26 (32.5%)	2.64±1.60	
Put nearly all of the acquired notions in pertinent contexts	Male	21 (26.25%)	3.22±1.59	0.1
	Female	8 (10%)	2.62±1.61	
	Total	29 (36.25%)	2.96±1.62	
Assesses and improve skills as a self-dependent learner	Male	23 (28.75%)	3.52±1.63	0.63
	Female	20 (25%)	3.41±1.62	
	Total	43 (53.75%)	3.47±1.61	
Assesses extent of information search for the learning resource	Male	23 (28.75%)	2.11±1.67	0.3
	Female	12 (15%)	3.09±1.69	
	Total	35 (43.75%)	2.47±1.68	
Improves critical thinking skills	Male	26 (32.5%)	4.46±1.77	0.02
	Female	19 (23.75%)	4.50±1.69	
	Total	45 (56.25%)	4.47±1.73	

In contrast, they had negative insight on the remaining three questions; made them master the technique of structuring the concepts and ideas discussed (mean, 2.64 ± 6.04) ($P=0.09$), assessed the extent of information search for the learning resource (mean, 2.47 ± 1.68) ($P=0.3$), and helped to put nearly all of the acquired notions in pertinent contexts (mean, 2.96 ± 1.62) ($P=0.1$).

At the end of the questionnaire, we asked them whether PBL was suitable for teaching and learning in surgery. Their attitude was positive (mean, 4.01 ± 1.58) ($P=0.06$). More than 63% of the participants thought that PBL should be retained as part of the surgical module.

DISCUSSION

Medical schools in Saudi Arabia require persistent improvements to maintain with the current changes in the learning process. The reported benefits of the PBL have prompted most local and regional medical schools to adapt their curricula to this teaching strategy¹⁰. Students in clinical modules possess the merits of effective thinking, robust learning ability, and they are enthusiastic to admit novel concepts and skills¹¹. In the college of medicine, Ha'il University, PBL had recently introduced into the surgery module curricula to keep up with the global changes in medical education. PBL affords the learners with a profound insight into the fundamental causes of pathophysiological phenomena, along with encouraging the improvement of communication skills, clinical cognitive and group collaboration. The case events are displayed and in details discussed about in small groups of 8 to 10 learners supervised by facilitators to encourage collaborations and encompass the learners throughout the learning activity¹². Almost in similar fashion, in this study, each PBL group was composed of 10 to 11 students.

It is expected that once students incur the transition, subsequently the negative perceptions towards PBL will be gradually minimized and its advantages will be grasped¹³.

Most feedbacks on PBL in the current study were categorized as positive. This was in consistence with others¹⁴⁻¹⁶. Whereas, in other studies the student's perception of PBL was more negative than positive^{13,17}. The main factor which guides the PBL is the "problem". It directs self-study, problem solving, and in sequence develops other critical skills¹⁸.

Teamwork: Most learners have a positive attitude towards PBL in the surgery module, as the majority of the students reported that the PBL sessions encouraged group or team work, as it assessed and improved contribution to work, enhanced communication and collaboration between learners, improved the ability of organization and cooperation, self-directed learning, and influences the self-confidence within the group as well as they claimed that PBL enables learners to evaluate the contribution of other team members. This was inconsistency with the results obtained from other studies¹⁴.

Self-learning ability: Clinical modules are a move from comprehensive tuition to learning in a particular field. PBL in this stage permits students to learn deeply and improves their self-confidence and self-learning skill¹¹.

In this study, the students positively agreed that PBL develops their self-confidence in self-directed learning. This

was similar to the findings in the literature^{19,20}. While, several researches had displayed that there is no entire consensus on the validation of PBL in the development and expansion of self-learning skills²¹.

Critical thinking: Perfectly, the educators at universities must put their attention to developing the hard as well as the soft talents of each learner. Inappropriately, education and learning as yet being supported or centralized solely on hard skills. The hard skills are about preparing tuition material (theory), whereas the soft skills are more aimed at strengthening the hard skills, that involve the critical thinking skill. Critical thinking skills are substantial to be embedded into students, particularly medical students who will be clinicians in the future. It should be done so that they can see, manipulate, and solve numerous issues they are facing in their future careers. Students must therefore be used to learning rather than listening to material elucidated by the teacher without knowing the real circumstances on the field²².

PBL can aid in the conversion of teaching from merely reproducing things and subjects that were learned to self-development and critical thinking¹⁴. The current study highlights the notable role of PBL in promoting students' critical thinking as well as literature search. This was similar to the findings of another study in Uganda²³.

In the current study, medical students in their surgery module favored PBL to develop most fields of learning outcomes. Accordingly, as future physicians, they agreed that PBL gives them better access to learning, better learning skills, greater satisfaction and better future outcomes. This was in line with the pervious study by Ibrahim et al.²⁴.

In the current study, most of the participants acknowledged that the PBL approach requires more time compared to CTM. A comparable conclusion was conveyed by the participant's impression that the PBL takes too long time²⁰.

In this study, the participants' negative perceptions towards some of different aspects of PBL were proportionate with the feedback from prior studies^{20,25}.

The uncertainty about the accuracy of the acquired knowledge, put nearly all of the acquired notions in pertinent contexts, structure the concepts and ideas discussed and the high workload were the most frequently mentioned negative perceptions of students in recently applied PBL in the surgery module. This was in keeping with that reported by Stokes et al.²⁵.

A diversity of factors might be influencing on the learners' overall perceptions towards PBL in the surgery module, perhaps due to the hybrid nature of the module, as well as the heavy workload. It is obvious that they also had less confidence in the PBL process in boosting their skill and knowledge development. Others attributed the negative perception to a lack of preparation and a need for adequate regulation of didactical innovations¹⁷.

CONCLUSION

College students and faculty are very interested in problem-based learning. Although they believe that the PBL is palatable, they have concerns about its inclusion. The learners had several recommendations related to both

students and faculty that involved training, support, and encouragement.

The student's insight into PBL was encouraging to continue adapting this method of learning in the surgery module. For improvement, students would be safely familiarized with PBL to know-how to enhance their clinical thinking through the PBL as well as complementary refinements are necessary to offer learners with an effective promising learning atmosphere and to take into account student points of view. Future studies comparing more medical colleges and institutes will provide a new perspective for comparison.

Limitations: The limitation of the current study is that PBL was not utterly and extensively applied in clinical courses.

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Authors' contribution: FFA and SAI were involved in concept development (provided idea for the research); FFA, EMK, FSA, KFA, MAA and AOA; designed the study (planned the methods to generate the results); FFA, SAI, EMK, SHA and AA organized and implemented the project, as well as part of writing the manuscript. FFA, EMK, FSA, KFA, SHA, ASA, AOA, MAA, AA and AAF.; participated in the collection and processing of data; FFA, EMK, FSA, SAI, SHA, F.A, ASA, AOA, MAA, AA and KFA their responsibilities included monitoring data and evaluating the results. FFA, SAI, ASA, MAA, SHA and AAF they searched the literature for information. Almost all of the authors contributed to conceptualization, writing, editing and review for manuscript (they wrote substantial portions of the manuscript).

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