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Perception of First and Second Year Medical Students on Problem-Based Learning in Universiti Malaysia Sarawak

Nan Ommar

Department of Basic Medical Sciences,
Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, Malaysia

Abstract: Faculty of Medicine and Health Sciences (FMHS), University Malaysia Sarawak (UNIMAS) is one of the institutions that adopted PBL as the teaching-learning methodology in its undergraduate curriculum since its inception in 1995. The main objective of this study was to explore the perception of medical students on Problem Based Learning (PBL) as one of the learning approach. A questionnaire-based survey was conducted on 165 first and second year medical students to explore their opinion on the various aspects of PBL conducted in the faculty. The students' perception on PBL was categorized into 4 themes: problem solving and self-directed learning aspects, collaborating as a group, the usage of learning resources and the role of the facilitators. The students recorded their responses on a 5point Likert scale; 5 point for strongly agree and 1 for strongly disagree. Most students have a good perception and positive attitude towards PBL and most of them agreed that PBL enhance their collaborative learning and team work skills. PBL was perceived as a beneficial learning method by the first and second year medical students as it enhances teamwork and communication skills.

Key words: Perception · Problem-based learning · Undergraduate medical curriculum · Team work · communication skills

INTRODUCTION

Problem-based learning (PBL) has swept the world of medical education since its introduction 40 years ago and the literature is replete with systematic reviews and meta-analyses, all of which have identified some common themes. However, heterogeneity in the definition of a 'problem-based learning curriculum' and its delivery, coupled with different outcome measurements, has produced divergent opinions [1]. A systemic review of problem-base learning in undergraduate, preclinical medical education has been conducted and was reported that twenty-two years of research showed PBL does not impact knowledge acquisition; evidence for other outcomes did not provide definitive support for enhanced learning. Work is also needed to determine the most appropriate outcome measures to capture the effects of PBL [2].

The faculty of Medicine and Health Sciences, University Malaysia Sarawak (UNIMAS) has adopted PBL as a teaching-learning methodology in its undergraduate curriculum since its inception in 1996.

The duration of undergraduate medical education is five years. A hybrid problem-based curriculum is the principal educational strategy in the first two years. This hybrid system is similar to the description by Neville [1] where the students are prepared by giving didactic lectures for fundamental concepts on which they elaborate in small group tutorials, facilitated by knowledgeable tutors who are able to provide adequate feedback on students' understanding and learning [1]. The students are grouped into a number of 10-12 students, with a lecturer appointed as a facilitator. The facilitators are mainly lecturers from the basic sciences and paraclinical sciences department who have attended at least a workshop on PBL and facilitation skills.

The trigger or problem is a text-based case which is usually a paragraph or two, describing the chief complaints, physical findings, results of some investigations and provisional diagnosis. As the students are working in a group, one student who has been chosen as the chairperson read the trigger out loud while others read along silently. This is to see what the trigger is about and to note down the words and

Corresponding Authour: Nan Ommar, Department of Basic Medical Sciences, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, 93150 Kuching, Malaysia.
Tel: +6082-292231, Fax: +6082-422564.

phrases that seem to be important to be able to understand the trigger.

The scribe is also chosen, who has to write the difficult terms and their clarification on the white board as the students contributed by looking up in the medical dictionary. The scribe then jots down the facts and ideas generated by the students. This is followed by a brainstorming or discussion session. A list of questions with "Why?" How?" "What? "When? "pertaining to the problem given are generated. All the issues are written on the white board regardless of how odd, narrow or broad they may be. The next step is refining the issues into learning objectives or learning needs. The whole process is monitored by the facilitator to keep the students on track. This trigger introduction session is given two hours usually on the Monday mornings. Students are expected to be able to discuss and generate learning objectives from the clinical scenario given to them as triggers with the help of a facilitator. They are also expected to know how to search for required information.

The students continue their learning by finding information from various resources such as textbooks, other library materials, articles, results of lab or field research, data sets, other electronically based resources, pamphlets from organizations, interviews with experts, museum exhibits etc. The process used for the collection of information to be able to discuss in depth with the group on the following Friday is regarded as self-directed learning (SDL).

With the acquired information from various sources the students meet again on Friday mornings for two hours. Students talk about what they have learnt, thus sharing with the group and learning from each other. The use of visual aids (e.g anatomy models, bones, charts diagrams on the white board, transparencies overhead projectors and LCD) is encouraged. The information is also critically analyzed and discussed. It is totally a student-centered discussion with the lecturer acting as a facilitator to bring out the best from the group. At the end of each session the group summarizes the information and the facilitator gives feedback to the students regarding the group performance.

Currently, there is lack of information on the effectiveness of PBL that has been implemented in the faculty of Medicine and Health Sciences. This study on the students' perceptions and attitudes on various aspects of PBL will provide a platform to primarily evaluate the PBL approach in Phase I curriculum [3-5].

Objectives: There is a need to explore know how first year and second year medical students in the Faculty of Medicine and Health Sciences manage their participation in PBL sessions for the development of the PBL curriculum and good PBL practice in the faculty. Thus the students' perceptions on PBL categorized into 4 themes: problem solving and self-directed learning aspects, collaborating as a group, the usage of learning resources and the role of the facilitators were chosen to be studied.

Methodology: This cross sectional descriptive survey was carried out by distribution of questionnaires to random students of year I and year II medical students (Cohort 2009 and 2010) in the faculty of Medicine and Health sciences, UNIMAS.

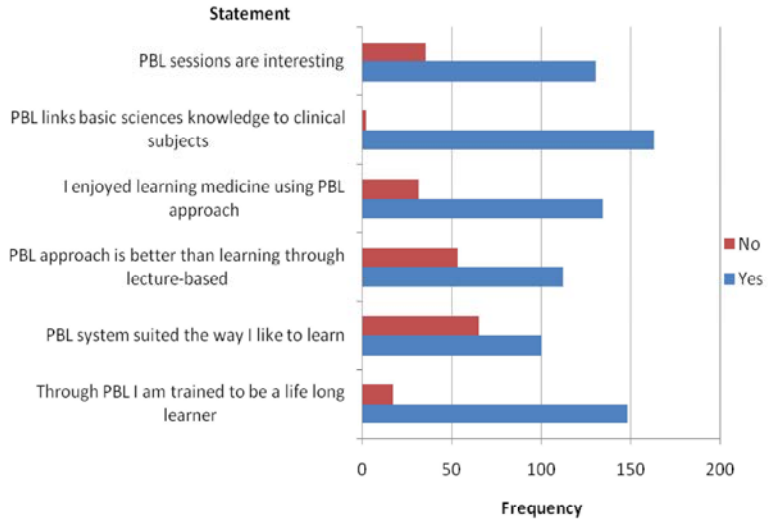
Questionnaires included age, sex, race, year of study and the number of PBL sessions attended. Opinion about different aspects of PBL, like students' participation, interest, cooperative learning, availability of learning resources and perception on the role of facilitators were included. The students recorded their responses on a 5 point Likert scale; 5 for strongly agree and 1 for strongly disagree. Some closed-ended questions were also included. Questionnaires were prepared by adaptation from Han and Teng, Barman *et al.*, Alper, A. [3-5].

For statistical analysis the statements were grouped into three, strongly agree and agree, neutral and strongly disagree and disagree. SPSS version 17 was used to analyse the data.

RESULTS AND DISCUSSION

A total of 165 year 1 and year 2 medical students in FMHS Unimas participated in the study. Among them, 98 students (59.4%) from year 1 and 67 (40.6%) from year 2. The range of age is between 19-22. The mean age is 19.73 with standard deviation 0.708. Female made up 66.7% of the respondents and male 33.3%. 46.1% of the respondents are Malays, 44.8% are Chinese, 3.6% Indians and 5.5% are other ethnic groups (Iban and Bidayuh).

As for the closed ended questions on overall reflection on PBL The results showed that 78% of students perceived that PBL sessions were interesting. 98.9% respondents agreed that PBL links basic knowledge to clinical subjects. 81.2% respondents enjoyed learning medicine using PBL approach. 67.9% believed that PBL is better than lecture-based learning and 72.7% and only 39.4% perceived that PBL does not suited the way they like to learn. 89.7% agreed that through PBL, they are trained to be a lifelong learner. (Bar Chart).



Bar Chart: Overall reflection of PBL perceived by the respondents

The Year 1 respondents were asked whether they would like to study PBL during their second year and 79.57% of them gave a positive answer.

These findings are similar to those of previously published studies [6-8]. Albanese and Mitchell [9] from the meta-analysis-type review also found that compared with conventional instruction, PBL, is more nurturing and enjoyable; PBL graduates perform as well and sometimes better, on clinical examinations and faculty evaluations.

Responses on perceptions on the following aspects are rated by 5 point Likert's scale:

- Problem solving and self directed learning (SDL)
- Cooperative Learning
- Learning Resources
- Role of Facilitator

In the present study a significant number of students showed a positive attitude towards to the various statements of PBL. Regarding problem solving and self directed learning, 105 (63.6%) students strongly agreed and agreed that PBL sessions were more effective in achieving learning objectives. Whereas 116 (70.3%) students strongly agreed and agreed that they can integrate their prior knowledge to solve the problem.

This is in agreement with Tsouab K-I *et al*., [10] as they stated that students in their study claimed that they were more active in learning and had better learning skills and confidence in self-direct learning as compared with students from lecture-based curriculum. This is also in agreement with Morales-Mann and Kaitell [11] who reported from their study that PBL produced clear benefits for students, such as increased autonomous learning, critical thinking, problem solving and communication. Woltering, V. *et al.* [12] found that motivation, subjective learning gains and satisfaction were achieved higher by the blended PBL students compared with the students learning by traditional PBL. Their statements were in line with the observation in this study as 121 students (73.3%) responded that they are motivated to study with real-life problems.

In this study75.8% agreed that members of a PBL group participated in the discussions, although 71.55% rated that some students work harder and 49.1% only participated actively. 81.2% agreed that PBL promotes team work and interpersonal skills. Wun *et al.* [13] suggested that PBL starting from the early years of a medical curriculum was associated with more active student participation, interaction and collaboration in small-group tutorials.

Morales-Mann and Kaitell [11] also reported from their study that the most frequently identified factors that influenced performance and learning in PBL were positive attitude and group effort. Nasir *et al.* [14] from their study stated that the effectiveness of small group discussion depends upon the strategies and skills of the tutor and students. For a successful small group discussion, all the participants must mentally prepare to take part in active discussion; share knowledge and skills for in-depth understanding of the topic.

Poor participation of some of the students could be attributed to four main factors; content knowledge, English proficiency, facilitators roles and students perceptions of these roles and social relationships

Table 1: Perception of students on problem solving and self directed learning

	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Statement	n	%	n	%	n	%	n	%	n	%
PBL sessions more effective in achieving learning objectives	19	11.5	86	52.1	50	30.3	9	5.5	1	0.6
PBL allows in depth understanding of the topics	30	18.2	85	51.5	45	27.3	3	1.8	2	1.2
Time allotted for each PBL session is enough	34	20.6	85	51.5	40	24.2	5	3.0	1	0.6
I can integrate my prior knowledge to solve the problem	20	12.1	96	58.2	43	26.1	5	3.0	1	0.6
I am motivated when I study the problem getting from real life	23	13.9	98	59.4	39	23.6	4	2.4	1	0.6
When searching the resources, I try to evaluate the relevancy of different books with the subjects to be studied	24	14.5	80	48.5	53	32.1	6	3.6	2	1.2
I can integrate the different subjects to solve the problem	10	6.1	83	50.3	65	39.4	5	3.0	2	1.2

Table 2: Perception on Cooperative learning

	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Statement	n	%	n	%	n	%	n	%	n	%
All members in my PBL group participate in discussion	45	27.3	80	48.5	30	18.2	9	5.5	1	0.6
Some students work harder to prepare them than others to participate in PBL discussion	46	27.9	72	43.6	40	24.2	6	3.6	1	0.6
PBL promotes better student participation in the learning process	35	21.2	87	52.7	36	21.8	4	2.4	3	1.8
PBL provided opportunities for me to contribute ideas	36	21.8	99	60.0	27	16.4	3	1.8	-	-
I usually participate actively during PBL session	15	9.1	66	40.0	74	44.8	10	6.1	-	-
PBL promotes students team work and interpersonal skills	36	21.8	98	59.4	27	16.4	3	1.8	1	0.6
PBL allows opportunity for hearing different perspectives and learning from one another	45	27.3	100	60.6	20	12.1	-	-	-	-

Table 3: Perception of students on learning resources for PBL

	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Statement	n	%	n	%	n	%	n	%	n	%
Enough learning resources are available in FMHS UNIMAS for PBL sessions	9	5.5	75	45.5	56	33.9	24	14.5	1	0.6
The resources provided by the library /internet allowed me to satisfy the course requirements	17	10.3	87	52.7	47	28.5	13	7.9	1	0.6
My learning resources are mainly from my lecture notes and text books	16	9.7	75	45.5	48	29.1	24	14.5	2	1.2
My resources are mainly from the senior students' work	4	2.4	26	15.8	57	34.5	55	33.3	23	13.9

Table 4: Perception of students on role of facilitator in PBL

	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Statement	n	%	n	%	n	%	n	%	n	%
The facilitator effectively facilitated the PBL sessions	24	14.5	89	53.9	46	27.9	5	3.0	1	0.6
Our facilitator helps us to find resources that are related to the topic	17	10.3	68	41.2	56	33.9	20	12.1	4	2.4
Our facilitator provide us with a positive learning environment	24	14.5	99	60.0	39	23.6	2	1.2	1	0.6
We can identify the learning goals for the trigger without depending on the facilitators	6	3.6	46	27.9	85	51.5	21	12.7	7	4.2
It is the facilitator's job to select the chairperson, not our group members	1	0.6	15	9.1	26	15.8	61	37.0	62	37.6

between group members [15].De Grave *et al.* [16] from their qualitative study stated that unequal participation, lack of elaboration and lack of interaction are the predomination barriers to effectiveness in PBL sessions.

In the present study 81.8% of the students perceived that PBL provides opportunities to contribute ideas,and 87% agreed that PBL allows them to exchange ideas and learn from others. Kivela and Kivela [17] also found that students valued communicative and interactive learning activities which highlight student centered learning more than the conventional lecture-based methods of learning. Habib *et al.* [18] also concluded from their study that students supported problem based learning as an effective method of learning and convinced that PBL helped them in building up communication skills, interpersonal relationship and problem solving capacity.

As for the perception on learning resources 50.9% felt that enough learning resources are available in the faculty for PBL sessions. The learning resources obtained are mostly from the library and internet (63%), while 55.2% obtained their information from the lecture notes and textbooks and 30% agreed that they obtained the information from the senior students' work. These findings may reflect that the faculty need to review and upgrade the learning resources, review and renew the PBL triggers, providing guidelines for searching for resource materials and brief the students and facilitators about the philosophy and principles of PBL [4].The diversification of learning resources and their access routes had a considerable impact on professional skills development. Students learn most effectively when using a variety of information resources. Therefore, provision of adequate resources meeting the needs of different learning styles is important [19-20].The extensiveness of different learning resources used is also an indicator of students self directed learning skill. The diversity of information sources influences the breath and depth of discussion [21].

Lohfeld *et al.* [23] highlighted the PBL facilitator as crucial to a successful problem based curriculum after the interview with Canadian residents. Students preferred tutors who had knowledge in both basic and clinical science areas, had appropriate facilitative tutorial skills and had positive personality traits [23-25]. Woltering V., *et al.* [12] also commented that the effectiveness of PBL depends on the tutors' quality and the students' motivation. Their statements are in line with the observation in this study as 74.5% students noted that the facilitators provided a positive learning environment and 68.5% of students agreed that the facilitators facilitated the sessions effectively. 51.5% noted that the facilitator helped them to find the resources that are related to the topic and 31.5% of the students were in the opinion that they were able to identify the learning objectives without the help of the facilitator.

CONCLUSION

In the present study PBL was perceived as a beneficial learning method by the first and second year medical students as it enhances teamwork and communication skills. It also showed that the faculty is able to adopt the hybrid approaches, that accommodate a diversity of learning styles of students. A combination of both the conventional and newer curricula may provide the most effective training for undergraduate medical students [26-27].

Based on the findings in this study, impact studies should be designed to check differences in actual and perceived benefits of PBL. The findings on the perception of learning resources provided by the faculty also reflected that the faculty needs to review and upgrade the learning resources and provide guidelines for searching for resource materials. Further research on students learning strategies and training of quality facilitators to improve effectiveness of PBL should be undertaken for further development of PBL curriculum in the faculty.

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REFERENCES

1. Neville, A.J., 2009. Problem-based learning and medical education forty years on. A review of its effects on knowledge and clinical performance Med Princ Pract., 18(1): 1-9. Retrieved on April 6 2011 from http://www.ncbi.nlm.nih.gov/pubmed/19060483.
2. Hartling, L., C. Spooner, L. Tjosvold and A. Oswald, 2010. Problem-based learning in pre-clinical medical education: 22 years of outcome research. Medical Teacher, Jan 2010, 32(1): 28-35. http://informahealthcare.com/doi/abs/10.3109/01421590903200789.

3. Han, L.C. and N.H. Teng, 2005. Effects of Problem-Based Learning on Students' Self-Directed Learning Behaviours in Mathematics. Redesigning Pedagogy: Research, Policy, Practice National Institute of Education, Nanyang Technological University, Singapore. Retrieved on August 15, 2010 from http://conference.nie.edu.sg/paper/Converted%20Pdf/ab00631.pdf.
4. Barman, A., R. Jaafar and N.M. Ismail, 2006. Problem-based Learning as perceived by dental students in Universiti sains Malaysia. Malaysian Journal of Medical Sciences, 13(1): 63-67. Retrieved on August11, 2010 from http://www.bioline.org.br/request?mj06011.
5. Alper, A., 2008. Attitudes towards Problem-based learning in a New Turkish Medicine Curriculum. World Appl. Sci. J., 4(6): 830-836.
6. Khoo, H.E., R.K. Chhem, M.C. Gwee and P. Balasubramaniam, 2001. Introduction of problem-based learning in a traditional medical curriculum in Singapore--students' and tutors' perspectives. Ann. Acad Med. Singapore, 2001 Jul, 30(4): 371-4. Retrieved on April 7, 2011 from http://www.ncbi.nlm.nih.gov/pubmed/11503542.
7. Seneviratne, R.D., D.D. Samarasekera, I.M. Karunathilake and G.G. Ponnamperuma, 2001. Students' perception of problem-based learning in the medical curriculum of the faculty of medicine, University of Colombo. Ann. Academic Medicine Singapore 2001; 30: 379-81. Retrieved April 4, 2011 fromhttp://www.ncbi.nlm.nih.gov/pubmed/11503544.
8. Saalu, L.C., A.A. Abraham and W.O. Aina, 2010. Quantitative evaluation of third year medical students' perception and satisfaction from problem-based learning in Anatomy. Edu. Res. Rev., 5(4): 193-200, April 6, 2010.
9. Albanese, M.A. and S. Mitchell, 1993. Problem-based learning: a review of literature on its outcomes and implementation issues. Academic Medicine, 68: 52-81. www.ncbi.nlm.nih.gov/pubmed/8447896.
10. Tsouab, K.I., S.L. Choc, C.S. Linad L.B. Syab, L.K. Yangae and T.Y. Chouaf, 2009. Short-Term Outcomes of A Near-Full PBL Curriculum In A New Taiwan Medical School. Kaohsiung J. Med. Sci., 2009. May, 25(5): 282-93. Retrieved January 4 2011 from http://www.kjms-online.com/article/
11. Morales-Mann, E.T. and C.A. Kaitell, 2001. Problem-based learning in a new Canadian curriculum J. Adv. Nurs., 2001 Jan, 33(1): 13-9.
12. Woltering, V., A. Herrler, K. Spitzer and C. Spreckelsen, 2009. Blended learning positively affects students' satisfaction and the role of the tutor in the problem-based learning process: results of a mixed-method evaluation. Adv. Health Sci. Educ. Theory Pract., 2009 Dec., 14(5): 725-38. http://www.ncbi.nlm.nih.gov/pubmed/19184497.
13. Wun, Y.T., E.Y. Tse, T.P. Lam and C.L. Lam, 2007. PBL curriculum improves medical students' participation in small-group tutorials. Med. Teach. 2007 Sep, 29(6): e198-203. Retrieved April 4 2011 from http://www.ncbi.nlm.nih.gov/pubmed/17917990.
Nasir, A., R. Nasir and A. Salam, 2008. Students' Perception of Small Group Teaching: A Cross Sectional Study. Middle east Journal of family medicine June 2008 (6) 5 Retrieved online on April 4 2011 fromIuhttp://www.mejfm.com/mejfmJune08_vol6-iss5/studentspercept.htm.
15. Imafuku, R., 2007. Proceedings of the Independent Learning Association 2007 Japan Conference (online): Exploring theory, enhancing practice: Autonomy across the disciplines M. Carroll, D. Castillo, L. Cooker and K. Irie, (Eds.)., 2009. Kanda University of International Studies, Chiba, Japan, October 2007. Retrieved April 6, 2011 from http://www.independentlearning.org/ILA/ila07/en/proceedings.
16. De Grave, W.S., D.H.J.M. Dolmans and C.P.M. Van der Vleuten, 2002. Student perceptions about the occurrence of critical incidents in tutorial groups. Medical Teacher, 23(1): 49-54. Retrieved on April 7, 2011 from http://www.springerlink.com/content/gu544408q0l141r1/fulltext.html.
17. Kivela, J. and R.J. Kivela, 2005. Student perceptions of an embedded problem-based learning instructional approach in a hospitality undergraduate programme. Intl. J. Hospitality Management, 24(3): 437-464 http://www.sciencedirect.com/science/journal/02784... Retrieved on April 6 2011 from http://www.cabdirect.org/abstracts/20053155064.html
18. Habib, F., L. Baig and F.A. Mansuri, 2006. Opinion of medical students regarding problem based learning. J. Pak. Med. Assoc., 56(10): 430-2. Retrieved April 6, 2011 from http://www.ncbi.nlm.nih.gov/pubmed.
19. Barrows, H.S. and R.M. Tamblyn, 1980. Problem-based learning: An approach to medical education. New York: Springer. Barrows, H.S., 1985. How to Design a Problem-Based Curriculum for the Preclinical Years. Springer Publishing Company, New York, 1985. Learning Theories Knowledgebase

(2011, April). Problem-Based Learning (PBL) at Learning-Theories.com. Retrieved April 8th, 2011 from http://www.learning-theories.com/problem-based-learning-pbl.

20. Musal, B., Y. Gursel, H.C. Taskiran, S. Ozan and A. Tuna, 2004. Perceptions of first and third year medical students on self-study and reporting processes of problem-based learning. BMC. Med. Edu., 22(4): 16.
21. Van den Hurk, M.M., D.H.J.M. Dolmans, I.H.A.P. Wolfhagen, A.M.M. Muijtjens and C.P.M. Van der Vleuten, 1999. Impact of Individual Study on Tutorial Group Discussion. Teach. Learn. Med., 11: 196-201. doi: 10.1207/S15328015TLM110403
22. Lohfeld, L., A. Neville and G. Norman, 2005. PBL in undergraduate medical education: A qualitative study of the views of Canadian residents. Advances in Health Sci. Edu., 10(3): 189-214.
23. Lin, C.S., 2005. Medical students' perception of good PBL tutors in Taiwan. Teach Learn Med. Spring, 17(2): 179-83. Retrieved March 4 2011 from http://www.ncbi.nlm.nih.gov/pubmed/17917990.
24. Kassab, S., Q. Al-Shboul, M. Abu-Hijleh and H. Hamdy, 2006. Teaching styles of tutors in a problem-based curriculum: students' and tutors' perception. Med. Teach., 28(5): 460-4. Retrieved April 6, 2011 from http://www.ncbi.nlm.nih.gov/pubmed/16973461.
25. Maudsley, G., E.M.I. Williams and. D.C.M. Taylor, 2008. Problem-based learning at the receiving end: A 'mixed methods' study of junior medical students' perspectives. Adv. in Health Sci. Edu., 13: 435-451. Retrived April 5 2011 from http://www.springerlink.com/content/0q224m63t6400694/fulltext.html.
26. Nandi, P.L., J.N. Chan, C.P. Chan, P. Chan and L.P. Chan, 2000. Undergraduate medical education: comparison of problem-based learning and conventional teaching. Hong Kong Med. J., 6(3): 301-6.
27. Nayak, S., K. Ramanarayan, N. Somayaji and K.L. Bairy, 2006. Teaching Anatomy in a problem-based learning (PBL) curriculum. Published online 26 January, 2006 © http://www.neuroanatomy.org Original Article Neuroanatomy, 5: 2-3.