

## Scope of Anatomy Teaching in Problem-based Learning (PBL) Sessions of Integrated Medical Curriculum

Alcance de la Enseñanza de la Anatomía en Sesiones de Aprendizaje Basado en Problemas del Currículum Integrado de Medicina

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**SUMMARY:** Problem based learning (PBL) made a great impact on the methodology of teaching. The major advantage of PBL method of teaching is integration of basic and clinical sciences in an integrated curriculum. This is achieved by presenting clinical problems to students which contain learning objectives from subjects related to the given clinical problems. In recent reports deficiencies have been reported regarding quantity of anatomy content of the clinical problems which has resulted in difficulty in understanding of the anatomy. We have made an attempt to quantify the content of anatomy and its sub-disciplines in PBL curriculum by a case study method using 'documentary analysis' at School of Medicine and Health Sciences, UCSI University, Kuala Lumpur, Malaysia. From the results of our study it is apparent that learning objectives for anatomy is not sufficiently spread across all the clinical problems and there is very less coverage of the sub-disciplines of anatomy particularly osteology and embryology. The benefits of PBL method of teaching is definitely more than that of traditional method, the uneven distribution of anatomy and its sub-disciplines had a major impact on the students during their clinical years.

**KEY WORDS:** Anatomy; Teaching; Problem –based learning.

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### INTRODUCTION

From the day it was initiated after the world's education summit in Edinburgh, problem-based learning (PBL) has established itself as an effective learning tool in enhancing the integration of basic and clinical sciences (McHarg & Kay, 2008; Fincham & Shuler, 2001). In the conventional / traditional curriculum, these disciplines are mostly taught in separate courses like Phase-I (pre-clinical phase) and Phase-II (clinical phase). This made it possible for the students to understand the basics of each subject with more in depth knowledge. Some studies have also indicated that students who have been taught in problem-based learning methods have (identified) deficiencies in their knowledge of basic sciences, particularly in areas such as anatomy. Outcomes of the studies on PBL have shown divisive results, sometimes indicating that medical students at PBL schools have less knowledge of basic sciences than their colleagues at traditional medical schools (Prince *et al.*, 2003; Bergman *et al.*, 2008). We made an attempt of evaluating the anatomy taught in PBL component of the curriculum at Faculty of Medicine & Health Sciences, UCSI University, Kuala Lumpur, Malaysia with reference to teaching and learning of anatomy. This study focuses mainly on how much of anatomy was essentially covered through the PBL sessions.

### MATERIAL AND METHOD

The methodology used was a case-study method, which was qualitative and non-experimental. The relevant data was collected through the 'documentary analysis' from PBL coordinator of the MD programme. In the present medical education research methodology, 'documentary analysis' represents collection and interpretation of data through study of curricula, various evaluation methods and class schedules obtained from case study school as reported earlier (Nayak *et al.*, 2006). In our work the case study school was the School of Medicine, UCSI University, Kuala Lumpur, Malaysia. The school has an integrated curriculum where PBL method of teaching and learning is more concentrated during Phase I (preclinical phase) of the MD programme. The phase II and phase III are clinical years. Phase I comprises of two years duration, where anatomy, physiology, biochemistry, pathology, microbiology, basic clinical medicine, pharmacology, genetics, behavioral sciences and community health are taught in integrated manner. During Phase I, there are two PBL sessions per week, named as session- I and session – II. The students are given a clinical problem in form of triggers during session-I, at the end of which the

students come out with the list of learning objectives for which the students have to look into further details and this is discussed in session –II. There are 16 modules in phase I of the curriculum (Table I). In our study, the clinical problems given during the Phase I were analyzed with reference to the content of anatomy learning objectives and its sub-disciplines like gross anatomy, histology, embryology and osteology.

## RESULTS

Our study shows that during Phase I, total of 29 problems were given during the PBL sessions. Of these 29 problems, 20 problems had anatomy component. The distribution of learning objectives among the sub-disciplines was, 20 had gross anatomy; 11 had histology; 1 had osteology and 1 had embryology learning objectives. The total number of the problems and the number of anatomy learning objectives covered in each module is given in the Table I.

From the analysis, we report that, the anatomy learning objectives were absent in Modules 3, 4, 11, 12 and 16. It is also noted on further analysis that embryology and osteology have the least number of learning objectives.

## DISCUSSION

In a PBL curricula the integration and understanding of a subject depends upon the number of learning objectives

on the subject that has been included in the clinical problem given to the students. This enables the students to give more importance and learns more about the subject. The analysis of the results from our study of the learning objectives in anatomy in a PBL curriculum shows that anatomy has not been covered extensively and evenly in all the modules. For example it can be seen in musculoskeletal module that there is no significant amount of osteology, while embryology has not been included in many modules. It is obvious from our study that some modules where there is large scope for teaching anatomy are having less learning objectives. This unequal distribution of various sub-disciplines of anatomy makes it difficult for the student to learn and holistic understanding of anatomy.

In the traditional way of teaching, the concentrated and in depth teaching of anatomy and its subdivisions have always enabled better understanding of the subject. This is because anatomy in traditional curricula is studied region wise where gross anatomy, osteology, histology and relevant embryology related to the region or organ is taught in combination. The early exposure to general embryology during the beginning of the year gives them more insight in understanding congenital anomalies in their clinical years. This definitely gives an advantage to understand the basic concepts upon which the student is able to build his clinical skills. At this stage we agree that students who have learnt in traditional curriculum have a good knowledge and application skills in anatomy over those in PBL curriculum. Anatomy in modern curriculum is still perceived to be a subject that is to be learnt in didactic and traditional way, making it vulnerable target in the process of modernization of learning experience (Turney, 2007).

Table I. Distribution of anatomy learning objectives in PBL Modules of Phase I in MD Programme

Phase I of MD Programme		Academic year															
		Year 1											Year 2				
Modules		Foundation in Medical Sciences	Basic Clinical Science	Haemopoietic system	Immunology	Cardiovascular system	Respiratory system	Nephrology	Endocrinology	Reproductive system	Gastrointestinal system	Community Health	Nutrition	Nervous system	Musculoskeletal & skin	Communicable Disease	Genetic
Duration (weeks)		9	7	3	2	4	3	3	3	4	5	2	1	6	4	1	2
Total number of problems		3	4	1	1	2	2	1	1	2	2	2	1	2	2	2	1
Gross Anatomy (Learning Objectives)		1	2	-	-	-	1	1	2	4	2	-	-	5	1	1	-
Histology (Learning Objectives)		1	-	-	-	2	1	1	1	3	1	-	-	-	1	-	-
Embryology (Learning Objectives)		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Osteology (Learning Objectives)		-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-

Problem based learning has now been recognized as a standard teaching method and many medical schools have incorporated it into their teaching curricula. PBL method has many advantages over the traditional curricula like integration of basic and clinical skills, enhancement of communication skills, improved motivational factors which are amalgamated using clinical problem solving approach which is vital for practicing clinician (Onyon, 2012). But in this process of learning through problem solving approach, the understanding of anatomy which is necessary for the practicing clinician is not complete and not much attention is given by the students, making it difficult to relate the basic concepts in anatomy to clinical medicine, which makes understanding of subjects stressful during the clinical years.

Learning medicine has taken a new dimension with the introduction of PBL curricula and we fully agree with the many advantages. But our study clearly indicated that anatomy is not given enough importance and the need to address the lacunae has become vital. One solution would be to integrate anatomy vertically into the curricula where the students are exposed to anatomy teaching throughout their study period and this will provide an opportunity to learn anatomy at an appropriate level of detail to the stage of training (Turney). Designing all clinical problems with emphasis on learning objectives in anatomy and its sub-disciplines. A coordinated approach should ensure that anatomy is distributed among all modules as do other subjects.

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**RESUMEN:** El aprendizaje basado en problemas (ABP) generó un gran impacto en la metodología de la enseñanza. La principal ventaja del método ABP es la integración de las ciencias básicas y clínicas en un curriculum integrado. Esto se consigue mediante la presentación de los problemas clínicos a los estudiantes, que contienen objetivos de aprendizaje de temas relacionados con los problemas propuestos. En informes recientes se han reportado deficiencias en cuanto a la cantidad de contenido de la anatomía en los problemas clínicos, lo que se ha traducido en dificultades en la comprensión de la anatomía. Hemos hecho un esfuerzo para cuantificar el contenido de la anatomía y sus sub-disciplinas en el curriculum de ABP mediante el método de estudio de caso con "análisis documental" en la Facultad de Medicina y Ciencias de la Salud, UCSI University, Kuala Lumpur, Malasia. A partir de los resultados de nuestro estudio es evidente que los objetivos de aprendizaje para la anatomía no se extienden suficientemente a través de todos los problemas clínicos, y hay poca cobertura de la anatomía en las sub-disciplinas, en particular osteología y embriología. Los beneficios del método de ABP en la enseñanza es, sin duda, mayor que la de los métodos tradicionales, además la distribución desigual de la anatomía y sus sub-disciplinas, tuvieron un gran impacto en los estudiantes durante sus años clínicos.

**PALABRA CLAVE:** Anatomía; Enseñanza; Aprendizaje basado en problemas.

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