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## Problem-based learning in pharmacology: a survey of department heads in Taiwan, China

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**KEY WORDS** problem-based learning; pharmacology; medical education

### ABSTRACT

Problem-based learning (PBL) requires active student participation and the use of clinical cases as a trigger to learn within a given area. It has gained much attention as a pedagogic alternative in the course of reform in medical education due to information overload. From discipline-based consideration, it is interesting to understand the views of department heads of pharmacology about implementing PBL for their medical students. According to a general survey from the heads of the department of pharmacology across medical schools in Taiwan, we found that although serious reservation about the approach remains, many departments indeed look forward to including PBL component in their pharmacology curriculum.

### INTRODUCTION

Pharmacology is usually considered as a paraclinical discipline which connects basic sciences to clinical sciences. The teaching of pharmacology to medical students generally faces at least two difficulties: learning how drugs are used before learning about the diseases and learning detailed facts about classes and actions of many drugs in addition to their mechanisms. Considering the current trend for curriculum revision of medical education, traditional lecture-based learning has been criticized as lacking the ability to connect basic sciences with clinical relevance<sup>[1,2]</sup>. Recently, problem-based learning (PBL) has been gaining support as an effective method for more active student participa-

tion and more clinical situation orientation in medical education<sup>[1-3]</sup>.

Most medical schools in Taiwan have already adapted curriculum reform with varying amounts of small group-oriented case discussions in addition to traditional lecture-based teaching in basic sciences. It is, however, not clear whether discipline-based basic science departments such as pharmacology are prepared to join the reform towards PBL. We thus surveyed chairpersons of pharmacology departments in Taiwan with a written questionnaire for their considerations to include PBL in their pharmacology curriculum.

### METHODS

The survey method for our investigation has been published<sup>[3]</sup>. Briefly, the questionnaire sent to the department heads includes information on: 1) Extent of present PBL implementation; 2) Future plan for PBL; 3) Personnel involved; 4) PBL classrooms; 5) Student self-assessment and departmental evaluation; 6) Ideal PBL proportion and 7) Perceived difficulties.

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## RESULTS AND DISCUSSION

Nine out of eleven medical schools have returned the questionnaire, however, not all the returned ones were complete. Four pharmacology departments now have implemented some kind of PBL program in their curriculum. The range of PBL implementation (as % of total semester hours) was wide: from 20 % to 75 %. However, the expected 'ideal' proportion of PBL was 40 % $\pm$ 15 % ( $n=7$ ). Only two respondents completed the information on student self-assessment data and the results were less than positive: less than half of the students thought PBL was beneficial and helpful for independent learning, and could enhance communication skills (only 37 %). About one-third of the responses thought the PBL approach was problematic and difficult to adapt whereas three quarter of the responses reported that PBL preparation took too much time.

The barriers or difficulties for implementing PBL in pharmacology as perceived by the department heads were summarized in Tab 1. The shortage of tutors presented the most serious concern of the department heads. Apparently the amount of preparations for carrying out a successful PBL program is tremendous and that constitute a real concern for a budget-tight and

**Tab 1. Potential difficulties for PBL as perceived by department heads.**

Academic environment	43 %
Assessment program	57 %
Faculty shortage	71 %
Tutor training program	57 %
Design of trigger problems	43 %

short-handed department.

Medical education in Taiwan differs in many regards from Western countries and the organization/administration of private or public medical schools in Taiwan face different sort of problems. Thus, the optimal design of pharmacology curriculum depends on the overall setting of the academic culture and in turn the overall learning environment is being modified gradually by attempts to add small group/PBL type of learning in the curriculum. It is surprising that there were more concerns about implementing PBL in pharmacology than in physiology<sup>[3]</sup>. Considering that pharmacol-

ogy is a discipline more applicable and closer to clinical science, the design of learning cases and incorporation of clinical relevance in them should be more obvious and easier to make. However, one may also speculate that the pressure for research performance may be higher for pharmacologists in terms of publications in Taiwan. This could hamper the incentive and/or effort for curriculum reform from the pharmacologists. However, there is little evidence to substantiate such a speculation, since the pressure for research output is not a unique problem for pharmacologists but rather for all basic scientists in medical schools as far as promotion is concerned. Also, it is not a unique problem for pharmacologists in Taiwan, it is a global reality.

Whether PBL is adequate to cover the numerous facts that students needs to memorize in pharmacology presents another concern. Recent study indicates that PBL students are at least as successful in standardized tests and enjoy their learning more than do conventional lecture-based learning students<sup>[4]</sup>. This is consistent with the Maastricht experience which shows that PBL is associated with strong motivation of learning without loss of factual knowledge<sup>[5]</sup>. PBL as a pedagogic concept, where student-centered learning rather than teacher-centered teaching is emphasized, has received considerable attention in teaching basic sciences including pharmacology in Asia<sup>[6,7]</sup>. This novel trend of thinking about curriculum reform thus serves one good purpose at the least: rekindle the interests of teaching among basic science faculty and foster the proper learning attitude among students. This issue can obviously be extended to disciplines outside pharmacology as well. Thus, the major problem perhaps is not whether PBL is effective for the teaching of pharmacology, but rather whether learning of pharmacology is effectively integrated into PBL.

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