



Experience Report



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From the hematology laboratory to clinical practice

Do laboratório de hematologia à prática clínica

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ABSTRACT | INTRODUCTION: It's important that the study of the medical practice should be a continuous process in which knowledge, competencies and attitudes are generated through strategies as PBL (problem-based learning) which is effectuated employing clinical case analysis. **OBJECTIVE:** To describe the experience of problem-based learning strategy in the hematology laboratories of our institution in order to improve the learning process and clinical field practice. **METHODOLOGY:** After the development of the laboratory practices, the clinical cases are made and explained to the students by the teacher's team, then the students have time to analyze it, and then diverse review questions are proposed in order to guide the student in the study of the proposed case, under the PBL methodology. Once the activity is explained to the class, they make teams that facilitate the knowledge and ideas intercourse. **RESULTS:** A better understanding of the theory of hematology laboratories after the solution of clinical cases was evidenced. **CONCLUSION:** The clinical-basic correlation in the hematology laboratory practice is an important matter for the correct development of competencies and attitudes through a more didactic methodology, so students can finally be able to perform and improve in a medical ambit and academic sphere.

KEYWORDS: Competency-Based Education. Medical Education. Problem-Based Learning

RESUMO | INTRODUÇÃO: É importante que o estudo da prática médica seja um processo contínuo em que conhecimentos, competências e atitudes sejam gerados por meio de estratégias como o PBL (*problem-based learning*), que se efetiva por meio da análise de casos clínicos. **OBJETIVO:** Descrever a experiência da estratégia de aprendizagem baseada em problemas nos laboratórios de hematologia de nossa instituição, para melhorar o processo de aprendizagem e a prática de campo clínico. **METODOLOGIA:** Após o desenvolvimento das práticas laboratoriais, os casos clínicos são feitos e explicados aos alunos pela equipe de professores, depois os alunos têm tempo para analisá-los e então são propostas diversas questões de revisão para orientar o aluno no estudo do caso proposto, sob a metodologia PBL. Uma vez explicada a atividade para a turma, eles formam equipes que facilitam a troca de conhecimentos e ideias. **RESULTADOS:** Evidenciou-se uma melhor compreensão da teoria sobre os laboratórios de hematologia após a resolução de casos clínicos. **CONCLUSÃO:** A correlação clínico-básica na prática laboratorial de hematologia é uma questão importante para o correto desenvolvimento de competências e atitudes através de uma metodologia mais didática, para que os alunos possam finalmente atuar e se aprimorar no âmbito médico e acadêmico.

PALAVRAS-CHAVE: Educação Baseada em Competências. Educação Médica. Aprendizagem Baseada em Problemas.

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Introduction

It is well known that the study of the medical practice should be a continuous process of learning innovation, actualization and performance improvement that lead students to integrate what they have learned and enable them to overcome the constant expanding, changing knowledge and advances in the medical ambit, in order to act in pro of society.^{1,2} This constant need for learn and update has become one of the main challenges for medical students and health professionals along with problem solving. Hence, during the years, since the Edinburg Declaration, it has been proposed the adaptation of measures that lead to improvements and increase of the results of medical learning update, problem solving skills and performance, allowing them the integration of teaching and field practice, via the resolution of problems.³

Thereby, practical teaching and its integration with the clinic can be developed by means of different learning strategies, like the ones defined as a group of mental processes, used by the individual in a particular learning situation in order to facilitate the acquisition of knowledge; in example of these strategies the literature illustrates the PBL (problem based learning) in which the starting point is the presentation of a real life clinical problem or situation, with the objective of identifying a certain scenario, define the key concepts, make research about term gaps and discuss learnings and solutions.⁴ Similar approaches are used in the CBL (case bases learning) and TBL (team bases learning) methodologies, and whereas in CBL a facilitator is in charge during a session to direct students towards the solution of problems and TBL the students are asked for mandatory prereading assignments before sessions, in PBL students generate questions of concepts and awareness of this ignorance leads to further research that can later be put in discussion in other sessions.^{2,4}

This methodology has contributed to the acquisition of skills and superior cognitive competences, like reasoning, adaptation, self-direct learning, logic, abstract reasoning and if is the case, teamwork in order to fill the gaps that they identify during the clinical problem solving. Rodríguez, states that, for problem solving, students must experience on their

own, face difficulties, capitalize on and discover a solution that drives to resolving uncertainty.⁵

The Hematology laboratory adheres by means of its learning strategies and components to the Integrated Pedagogical Model of the University to enhance competences and human capacities of the students via reflection, self-learning, research and attitudes such as autonomy, respect and justice, providing them with integrated education and innovating in knowledge.⁶

For the application of this strategy as a complement to the Hematology Laboratory, a systematic search method, discussion and topic revising was proposed in order to provide the medical community with the experience of problem-based learning methodology applied to the hematology laboratory students in our university, which is extremely enriching and provides tools that enables them to develop in the medical field and thereby improve medical knowledge.

Methodology

The Hemathology laboratory practice is part of the physiology course thaught during second year of medical school, which is part of the basic disciplinary cycle of the Medicine program of the Universidad Pontificia Bolivariana, it is a presence-based model, taking place in the Hemathology laboratory. The main objective of the practice is to provide students tools for the development of competencies and human skills for self-learning, abstraction and critical thinking through clinical case studies related to hematology pathologies, analysis of basic hematology laboratories, in example; hemoleucograms, coagulation times and test such as the tourniquet tests in order to provide accurate results, blood sampling and process of the samples, presentation of clinical cases and group discussion. In addition, basic knowledege necessary for the comprehension of the different hematological pathologies, and physiological knowledge to understand the hematopoyetical normal functioning, via a text guide that includes the study of diverse elements of the blood and the haemostatic system, a brief clinical correlation, an atlas with laboratory materials and blood cells, as well as a description of the different activities that are imparted during the course.

In the search to position the learning directed by the motivation in the center of the formative process, the Laboratory of Hematology proposes to offer an active role to the students, that allows them to provide meaning to what they learn, confronting situations close to reality through the resolution of clinical cases, thus abandoning the traditional role of teaching theory and promoting the development of critical thinking, decision-making and problem-solving, via the problem-based learning methodology.⁷⁻⁹

In order to implement this learning method, professors develop a clinical case according to the topic seen during the practice, the one includes the pathology's principal characteristics, such as symptoms and signs, laboratory tests results, procedures performed, and equally important, diverse review questions are proposed in order to guide the student during the resolution of the proposed case, under the PBL methodology. Once the activity is explained to the class, a deadline for the resolution of the case is proposed, and they make teams to facilitate knowledge and ideas intercourse through dialogue and joint decision-making.

When the deadline is accomplished, the case is evaluated in the laboratory following the next steps:

1. Presentation of the clinical record by the teacher or tutor in charge.
2. Students intervene during the discussion and comment about the correct anamnesis, physical exam, relevant and key points from the patients' history information that helped build the diagnostic impression and definitive diagnosis.
3. Debate about the physiological course of the disease, pharmacological aids and laboratory findings, in order to highlight the importance of basic sciences and laboratory sciences in the implementation of the clinical activities.
4. Discussion of the proposed questions given at the beginning of the course, feedback and questions.

The main characteristics of this practice is in the student research and the search for skills in relation between structure-functioning- processes in the

laboratory and in this manner they can accomplish a correct analysis and comprehend a real clinical situation.

Finally the tutors and teachers gather all the teams and a conversation is held, where the students may ask, propose and explain different ideas to a solution around the patient and, at the same time, a rubric previously sent to the students by the teachers is being evaluated.

Results

Through laboratory practices, it has been possible to obtain better results in the knowledge of the students that are evidenced in the resolution and in the communicative skills to solve the clinical cases that are proposed. Also through this practice, the teaching team promotes decision-making and problem solving, so that in clinical practice as in the feedback of clinical cases in laboratories, the effectiveness of the pedagogical model used is reflected

Focusing on human skills and capacities, the students describe that learning is being facilitated by performing a good theoretic-clinical correlation with the clinical cases, as opposed to having to memorize the different topics for an exam; in the same way, they describe that the conversation sessions are being done in an active and dynamic environment, promoting respect and without the stress that can be produced taking a handwritten exam.

Discussion with the literature

PBL is a pedagogical method that can be performed individually or in groups. Currently, it is widely spread among academic institutions and allows students to develop research skills, starting from autonomy, since it is necessary to perform a systemic analysis of the clinical case presented, reading and understanding it, followed by the identification of unknown terms.⁵ This allows the student to develop a proactive attitude towards their work and acquisition of knowledge that is evident in the clinical field.¹⁰

In the review article by Trullàs et al., it was demonstrated that the PBL methodology had better performance and satisfaction among students compared to other traditional methods, because it does not only improve social and communication skills, but also self-learning and academic performance. It is important to clarify that teachers must be highly trained to carry out this type of activity.⁴

Due to its value, it is important for the college community, both the teachers and its group students, be able to implement a guided strategy without obstacles, to provide the best experience to the students. This can facilitate the students' training process if they are correctly implemented in the framework of dynamic teacher-student relation, which leads to the identification of weaknesses and strengths that lead to the general improvement of the university academic context.

The only limitation of the practice was teamwork, due that some of the students do not have commitment to the activity and delegated their corresponding tasks to other members, therefore the tutors and teachers performed the corresponding questions to each of the evaluated teams, thus evidencing the comprise that each student has with the practice or if they require help with the propose topics for the development of the case

Conclusion

The clinical-basic correlation in the hematology laboratory practice is an important matter for the correct development of competencies and attitudes that aims to the integration of learnings by the students that are being evaluated in physiology, allowing the implementation of these in their practice, in a more didactic methodology and giving them tools, so they can finally be able to perform and improve in a medical ambit and academic sphere.

This type of practices are useful in order to achieve the best learning results and to demonstrate in a concrete way the achievement of competencies and skills in students who are in medical training.

New generations increasingly require more diverse, dynamic and challenging teaching-learning methodologies and strategies that allow for greater cognitive development.

As a teaching team, we are constantly evolving, always looking for a better performance of our students and satisfy the expectations of the new generations.

Authors' contributions

Sanchez LMM, Echeverri LD and, Sánchez CD, participated in the conceptualization of the idea of the strategy, its respective analysis, methodology, supervision, writing and editing the article.

Conflicts of interest

No financial, legal or political conflicts involving third parties (government, companies and private foundations, etc.) were declared for any aspect of the submitted work (including, but not limited to grants and funding, participation in an advisory board, study design, preparation manuscript, statistical analysis, etc.).

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