

EXPERIENCE REPORT: IMMUNOLOGY PRACTICE FOR UNDERGRADUATE NURSING STUDENTS

RELATO DE EXPERIÊNCIA: PRÁTICA DE IMUNOLOGIA PARA ESTUDANTES DE GRADUAÇÃO EM ENFERMAGEM

RELATO DE EXPERIENCIA: PRÁCTICA DE INMUNOLOGÍA PARA ESTUDIANTES DE GRADO EN ENFERMERÍA

Maria Verônica Ferrareze Ferreira ¹

Bruna Juliana Moreira ²

Vânia Brazão ³

Ricardo José Fagundes ⁴

Ana Paula Morais Fernandes ⁵

¹ RN. PhD in Nursing. University of São Paulo – USP, Nursing College of Ribeirão Preto – EERP, General and Specialized Nursing Department. Ribeirão Preto, SP – Brazil.

² Pharmacist. MS in Pharmaceutical Sciences. USP, EERP, Laboratory Support Section. Ribeirão Preto, SP – Brazil.

³ Pharmacist. PhD in Sciences. USP, EERP, Laboratory Support Section. Ribeirão Preto, SP – Brazil.

⁴ Biologist. USP, EERP, Laboratory Support Section. Ribeirão Preto, SP – Brazil.

⁵ RN. PhD in Fundamental Nursing. Professor. USP, EERP, General and Specialized Nursing Department. Ribeirão Preto, SP – Brazil.

Corresponding author: Maria Verônica Ferrareze Ferreira. E-mail: mveronica@eerp.usp.br

Submitted on: 2017/04/04

Approved on: 2017/11/08

ABSTRACT

Objective: To describe the experience of the strategies and actions for insertion of activities theory-practice in the discipline of Immunology for undergraduate students in nursing. **Method:** a descriptive study, type experience reports of activities developed with students of an institution of higher education public, state of São Paulo, in the period from August to September 2015. **Results:** until 2014 the discipline of Immunology embraced expository methods to address its contents. In 2015 was implemented a simulated activity in the curricular structure of the course, which provided a pedagogical proposal more dynamic, innovative and pro-active, favoring the group work and student participation in the construction of their own knowledge. **Conclusion:** it is concluded by the experience that the articulation and integration of content in theory and practice favor the teaching-learning process and allow the strengthening of new methodological postures to be used in daily practice of curriculum for the training of nurses.

Keywords: Education, Nursing; Teaching; Students, Nursing; Allergy and Immunology.

RESUMO

Objetivo: descrever a experiência das estratégias e ações adotadas para inserção de atividades teórico-práticas na disciplina Imunologia para estudantes de graduação em Enfermagem. **Método:** estudo descritivo, tipo relato de experiência, de atividades desenvolvidas com estudantes de uma instituição de ensino superior pública do interior paulista, no período de agosto a setembro de 2015. **Resultados:** até 2014 a disciplina Imunologia adotava métodos expositivos para abordar o seu conteúdo. Em 2015 foi implementada uma atividade simulada na estrutura curricular do curso, que proporcionou uma proposta pedagógica mais dinâmica, inovadora e proativa, favorecendo o trabalho em grupo e a participação do estudante na construção de seu próprio conhecimento. **Conclusão:** concluiu-se, pela experiência vivenciada, que a articulação e integração de conteúdos em atividades teórico-práticas favorecem o processo ensino-aprendizagem e possibilitam o fortalecimento de novas posturas metodológicas a serem utilizadas no cotidiano da prática curricular para a formação de Enfermagem.

Palavras-chave: Educação em Enfermagem; Ensino; Estudantes de Enfermagem; Alergia e Imunologia.

RESUMEN

Objetivo: describir la experiencia de las estrategias y acciones para la inserción de las actividades teórico-prácticas en la disciplina de Inmunología para estudiantes de grado en enfermería. **Método:** Se realizó un estudio descriptivo, tipo relato de experiencia, de las actividades desarrolladas con estudiantes de una institución de enseñanza superior pública del estado de São Paulo, en el período comprendido entre agosto y septiembre de 2015. **Resultados:** hasta 2014 la disciplina de Inmunología adoptaba métodos expositivos para enfocar su contenido. En 2015 se implementó un simulacro de actividades en el plan de estudios del curso, lo cual proporcionó una propuesta pedagógica más dinámica, novedosa y pro-activa, favoreciendo el trabajo en grupo y la participación estudiantil en la construcción de su propio conocimiento. **Conclusión:** por esta experiencia se concluye que la articulación e integración de contenidos en actividades teórico – prácticas favorecen el proceso de enseñanza-aprendizaje y permiten el fortalecimiento de nuevas posturas metodológicas a utilizar en la práctica cotidiana del plan de estudios para la formación de Enfermería.

Palabras clave: Educación en Enfermería; Enseñanza; Estudiantes de Enfermería; Alergia e Inmunología.

How to cite this article:

Ferreira MVF, Moreira BJ, Brazão V, Fagundes RJ, Fernandes APM. Experience report: immunology practice for undergraduate nursing students. REME – Rev Min Enferm. 2017[cited _____. _____. ____];21:e-1060. Available from: _____. DOI: 10.5935/1415-2762.20170070

INTRODUCTION

Higher education in health has been modified many times along its history to accommodate for changes in pedagogical trends, guiding the education of both professionals and professors. To this end, new pedagogical trends were incorporated, gradually substituting the traditional teaching models with the education of critical and thoughtful professionals, able to build knowledge and develop the abilities needed to change the social reality of their daily lives.

Considering this situation, an active methodology is a possible strategy, since in it the students are subjects that actively participate and are co-responsible for their educational trajectory, while the educator takes a supporting role. Simultaneously, the integration of experiences related to the learning process is facilitated.¹

The implementation of innovative methodologies focused on simulated activities allows for experimentation through immersion in reality, the training of abilities, the resolution of different situations in work environments, and team experiences, as to promote the safety of both the patient and the professional in training, based on the imperative of ethics in care. Considering this, the practice helps in the development of the necessary competences for the work environment, and allows for its dynamics to be conducted in controlled, participative, interactive, and safe environment.^{2,3}

Even when considering the perspective of active methodologies, the importance of Immunology in the education of nurses stands out in all different areas of professional action. In addition, one must consider the relevance of identifying the components of the immunological system in the human organism and in its innate and adaptive immune reactions, including its structural and functional organization.⁴

The content studied in the Immunology discipline aims to train the student to understand the role of antigens, antibodies, and the relation between them. Also, it makes possible for an understanding of the main immunologic methods applied to the diagnoses of diseases, as well as the development of techniques able to promote an improvement in the health and quality of life of human beings, such as immunization (vaccines and serums).⁴

Therefore, recognizing the relevance of the articulation and integration of content in theoretical-practical activities that allow for group learning and the participation of the students in the construction of their own knowledge, these strategies are believed to contribute for the generation of innovative practices in the context of active methodologies, thus favoring the teaching-learning process. In addition, they corroborate future orientations of the interest in educational settings and, more specifically, in Nursing.

Regarding the relevance of this subject, this study aimed at describing a simulated experience proposed by the discipline Immunology, discussing themes that are considered to be essential for the graduation of nurses.

EXPERIENCE DESCRIPTION

This is a descriptive study, an experience report of the strategies and actions adopted to the insertion of a simulated experience in the discipline of Immunology for undergraduate Nursing students.

The investigation was developed from August to September 2015, in a public higher education institution (HEI) in the countryside of the state of São Paulo. The students invited to participate in this research were the ones regularly enrolled in the nursing courses who were present in theoretical-practical activities conducted in a teaching lab, on the content about Immunology taught according to the current syllabus.

After explaining the objectives of the research, it becomes relevant to mention that all undergraduates agreed to participate, generating a total of 80 students from the second semester of the Bachelor Nursing course and 49 from the fourth semester of the Bachelor and Licentiate Nursing degree course.

In addition, since this is an experience report, the Free and Informed Consent Form was not applied. However, the institution where the work was conducted gave its permission. Also, information that may allow the participating subjects' names to be revealed will not be divulged, since the identification of the participants is not necessary for the study. Their privacy will be preserved, and the confidentiality of their data maintained.

The objective of the Immunology discipline is that the student should be capable of associating basic and applied Immunology concepts – such as the anatomy and physiology of the immunologic system –, and classifying the cells and molecules according to their function and the mechanisms that act in innate and adaptive immune responses. Furthermore, the discipline considers their knowledge about inflammatory response, effector mechanisms involving induced immunological responses as a result of microorganism infections, organism responses to tumors, hypersensitive reactions, rejection of transplants, and diseases mediated by immunologic mechanisms, including their implications in Nursing assistance.

It should be highlighted that up to 2014, the discipline used expositive methods to teach its contents. In 2015, a simulated experience was implemented, one that, through a theoretical-practical activity, aimed at discussing themes that were considered essential for the education of nurses, such as the confection of blood smears, the identification of the formed blood elements, blood grouping tests and Rh group testing.

To do so, the planning of the activity started in 2014, including the training of the HEI workers in the Clinical Analysis Lab of the College of Pharmaceutic Sciences in the University of São Paulo, in Ribeirão Preto (LAC – FCFRP – USP). This strategy included the participation of lab technicians, as well as that of the professor responsible for Immunology and a post-graduate student.

In addition, the acquisition of certain materials was required, among which were: a support for microscope slides (for coloring and drying), polished and spreader slides, hematologic dyes, lab dropping bottles, antibodies for hematologic grouping tests and Rh grouping tests, wooden sticks, a hard box for the collection of piercing and sharp objects, kidney shaped water basins, procedure gloves, cotton, alcohol 70° GL, lancet, square shaped white filter paper, and toilet paper. It also stands out that some materials and equipment from the laboratory were used, such as: wash bottles, binocular microscopes, trays and thumb forceps. Slide supports were made up from a section of the University called Precision Workshop.

All necessary material was equally made available throughout the workbenches (Figure 1), to groups of two or three students (this three-people group was formed due to the odd number of participants).



Figure 1 - Group of materials made available for each pair/trio of students. Description of materials: 02 spreader slides and 08 polished slides (to place the samples), 08 lancets, 02 pairs of thumb forceps, 01 tray with a support for the slides, 01 support for drying the slides, 01 hard box for the collection of piercing and sharp objects (1 L), 01 dispensing bottle for 70° GL alcohol (100ml), 01 stainless steel recipient with cotton balls, 01 wash bottle containing tap water, 01 dropping bottle containing hematologic dye, 01 dropping bottle containing buffer solution pH 7.0, 06 toilet paper leaves, and one 50 x 50 cm paper filter.

During the confection of blood smear procedures, the identification of formed blood elements, the blood grouping test and the Rh grouping test, each student played the role of patient and professional, able to consent whether to allow or

not a blood sample to be extracted, with a lancet, through a fingerprick. All students accepted to participate in blood collection, which followed the recommended biosafety procedures.

The basins were available to the students on the workbench to temporarily contain any procedure residues. It should be mentioned that all residues (chemical, infectious and piercing/sharp ones) were properly packaged and underwent all recommended procedures.

Regarding the organization of the activity, it should be highlighted that the Bachelor's course group was separated into two 40-student groups. Therefore, the classes lasted for 90 minutes per group, with a 30-minute interval for the reorganization of the space. The Bachelor and Licentiate Nursing course group was not divided, their 49 students participated in the activity together.

BLOOD SMEAR TEST TECHNIQUE

It is noteworthy that the objective of having the students of the Nursing undergraduate course conduct a blood smear was that of teaching them to identify the formed blood elements through a blood sample, as well as to dye the blood and use other processes to make it more visible to the binocular microscope.

For students to be able to perform the blood smear test, specific guidelines were elaborated (Figure 2), describing the procedure as well as its objectives and the materials used. In addition, there was a space in the guidelines where the students could insert information about the sample observed in the microscope.

To make the understanding of the procedure easier for the students, lab technicians recorded two videos using a Sony Cyber-shot DSC-W730 camera. The first one showed how to place the blood drop on the polished slide, through the pressure of the pricked finger. The second one showed the method of spreading the collected blood drop. Both videos were played before each procedure. A computer slide was also displayed during procedures, teaching how to make the microscope slide more visible.

To perform the technique, three polished slides were used. Alcohol 70°GL was applied to each slide, to degrease them. Later, each student put on the procedure gloves, identified their slides with the name of the subject from whom the blood was collected, performed the fingerprick of their colleague, and placed the blood drop in one extremity of the slides. Three blood drops were used, one for each slide.

The spreader slide was placed in the region before the drop, with a 45° tilt, and moved towards the blood sample until it touched it. Thus, the blood was spread through the entire border of the slide and, after that, through a uniform and soft forward motion, a thin blood film was formed on the surface of the polished slide.

PRACTICAL CLASS: BLOOD SMEAR

OBJECTIVE: To learn the blood smear method and observe the slide, identifying the elements present in it (monocytes, neutrophils, basophils, platelets, erythrocytes, lymphocytes and eosinophils).

MATERIAL:

- Alcohol 70°;
- Cotton;
- Tray;
- Hard box for sharp objects (1 L);
- Kidney shaped water basin;
- Dropping bottle containing buffer solution;
- Dropping bottle containing hematologic dye;
- Glass 76x26mm slide with ground edges;
- Polished 76x26mm glass slide (spreader);
- 13x4.5mm lancet or needle;
- Pencil;
- Filter paper;
- Soft paper;
- Wash bottle containing tap water;
- 16 cm thumb forceps;
- Support for microscope slides.

PROCEDURE:

You will be sharing the workbench with a colleague. The person that performs the procedure must clean their hands and put on procedure gloves before starting.

- Be sure that all the material described above is on your workbench;
- Material preparation: clean all slides using a piece of soft paper damped in alcohol and properly identify the ground edge of the slide with a pencil (write the initials of your colleague/patient on it). Put them aside so you can place the sample on them.
- Patient preparation and sample collection: your workbench colleague will be your patient, from whom you will collect blood through a fingerprick of their index finger.

1. Clean the region to be collected (with cotton damped in alcohol) and massage the chosen finger so that its center becomes redder, and keep it pressed.

2. Get the lancet to perform the fingerprick and discard it immediately after in the box for sharp objects.
 3. Collect the drop of blood by bringing the slide to the suspended drop, without touching the skin. The blood drop should be placed near the ground glass edge of the slide. Note: the blood must not touch the ground glass edge of the slide.
- Blood smear spread: the spreading will be performed using a common polished slide, which will be placed at a 45° angle to the slide with the sample
 1. Place the polished slide (spreader slide) right in front of the blood from the sample.
 2. Drag the spreading slide until it touches the drop of blood and wait for a moment for the blood to entirely spread on the edge of this blade.
 3. In one motion, pull the spreader slide with the blood drop to the end of the sample slide. Note: the spreader slide should be pressed against the sample slide during the movement.
 4. After the spreading is conducted, place the sample slides on the slide support inside the tray to proceed with the drying.
 - Coloring of the blood smear:
 1. Place the amount of hematologic dye necessary to cover the entire slide and wait for five minutes. Note: count how many drops were added to the slide.
 2. After the period mentioned above, add the same number of drops to the buffer solution and wait for 12 minutes. Note: the buffer solution is in a labeled dropping bottled.
 3. After the 12 minutes, let the dye run down the slide and then clean the slide with water from the wash bottle.
 4. Drain the water from the slide and let it dry at room temperature, on the slide support.
 - Microscope observation: after the slides are dry, observe the cells present in the blood smear.

NOTES:

Figure 2 - Guideline for the blood smear technique.

After the spreading of the blood in the three slides, the best one was chosen for coloration. This stage was performed to both save hematologic dye and reduce the amount of chemical residue generated. Blood coloration was conducted simultaneously by the pair to diminish the time taken by the procedure. The first stage, which used the hematologic dye, lasted for nearly five minutes. The second one, based in the addition of a buffer solution with pH 7.0, lasted for 12 minutes. After this period, the students let the dye drop from the slide onto the tray that was placed on the workbench, and proceeded to clean the blades with water, after what they put them vertically in a support, to dry.

After the drying of the slides, the students observed the result of the coloration of the smear at the microscope, identifying its morphologic characteristics and comparing those in the cells to the ones presented on the computer slide projected on the wall (qualitative analysis). Monocytes, neutrophils, basophils, platelets, erythrocytes, lymphocytes and eosinophils.

While the slide was naturally drying, the students conducted the blood grouping and Rh grouping blood tests.

BLOOD GROUPING AND RH GROUPING TEST TECHNIQUES

In this stage of the theoretical-practical class, the students were asked to identify their own blood types and Rh

factors through blood samples and active (direct) hemagglutination tests.

In this technique, a drop of blood is mixed with a drop of antigen A and antigen B antibodies, on a glass slide. When the blood cell contains these antigens in its surface, it is possible to see clusters of them, which allows for the identification of the individual's blood group. If that happens when the patient's erythrocytes are mixed with the A antibody, it means that the antigen A is present, and the blood is of type-A. When it happens when the blood is mixed with the B antigen, the blood is of type-B. If it happens in both occasions, the blood is type-AB. When no clustering occurs, the blood is then classified as type-O, since there are no antigens in it.⁶

Regarding the Rh factor, the most common antigens are: D, C or c, and E or e. These show themselves during erythrocyte differentiation. To determine the Rh factor during the theoretical-practical class, the antibody AntiD was used, because it is capable of connecting to all mature erythrocyte cells.⁷

To identify the blood groupings (ABO system) and Rh factor, computer slides were projected in a wall to aid in the performance of the procedure and in the comprehension of its potential results.

To perform the technique, a polished slide was used. Alcohol 70°GL was applied to the slide, to degrease it. Later, each student put on the procedure gloves, identified the slide with

the name of the subject from whom the blood was collected, performed the fingerprick of their colleague with a lancet, and placed three blood drops on the surface of the slide.

Later, the sequential application of antiA, antiB, and antiD monoclonal antibodies was conducted by the lab technicians in each drop collected, to guarantee that there would be no direct contact between the reagent and the samples, preventing contamination and possible interferences in the following tests. The reagent bottles were refrigerated in temperatures from 2-8°C, being exposed to the room temperature only during their use.

After that, the students carefully homogenized the samples with the wooden sticks provided, as not to mix them.

Lastly, they read the tests, interpreting and discussing the results under the guidance of the professor.

DISCUSSION

In general, society determines that education should prepare the student to confront challenging situations every day, thus demanding the teaching process to be constantly renewed, eschewing mere information transfer techniques. To this end, the bases for an active learning process that allow for a greater participation of the student is in the development of strategies that associate “doing” and “critical and reflexive thinking”. Therefore, Nursing has been trying to get closer to innovative references and adopt active methodologies through critical teaching techniques, the ideal methodological resource for the education of the nurse.^{2,8,9}

Consequently, in the simulated activity described in this report, the undergrad could experience the role of the nurse — the professional responsible for the collection of biological samples —, the role of the patient — who in this case was manipulated through an invasive technique of blood sample collection —, and that of the lab technician — who processes the material. Thus, the Nursing students were made aware of each situation, and had the opportunity to get closer to all aspects of the process. In addition, it should be considered that the proposition contributed to guide undergraduate students to better decisions when it comes to their professional lives and the search for unique approaches based on practice, making the acquired knowledge richer.

From these results, it is possible to emphasize that the teaching lab used for the class had an adequate structure, and is available to the university community. The activities developed there were paramount for the understanding, interpretation and apprehension of the studied content.

Therefore, one of the challenges that the researchers had to face when developing the simulation was related to its planning, which required the organization and composition of the

environment, the previous training of the workers involved, the acquisition of material and digital objects needed for the procedure, as well as the elaboration of guidelines. These factors revealed new aspects inherent to the teaching process that was, up to that point, routinely used in the discipline.

Despite that routine, a choice was made to pursue the difficult task of finishing all stages involved in this study, in order to offer and incorporate more attractive, interactive and safe educational experiences with low financial costs, experiences that could be continuously used in the teaching institution where they were idealized, as well as in other academic contexts.

FINAL CONSIDERATIONS

It was found that the implementation of a simulated experience in the Immunology field allowed for a more dynamic and proactive methodology, that favored group work and the participation of the student in the building of their own knowledge.

Limited to the description of the techniques above, this article invites readers and researchers to advance the studies of the theoretical-methodological assumptions that were merely mentioned here. This study, far from pretending that the subject is concluded, represents a call to educators for the development of researches and works that can contribute for the debate, adding to the discussions on the theme at hand.

Confronted with the magnitude of what was exposed, the adoption of this teaching strategy collaborated for the education of a more creative and reflexive professional. Finally, it was concluded, through the dynamic experienced in this simulation, that the proposition of articulating and integrating theoretical-practical content favored the exposition of content and the teaching learning process, making it possible to strengthen methods that are appropriate to current and innovative pedagogical propositions, and can be used in the syllabuses of university courses for the education in Nursing.

REFERENCES

1. Prado ML, Velho MB, Espíndola DS, Sobrinho SH, Backes VMS, Arco de Charles Maguerez: refletindo estratégias de metodologia ativa na formação de profissionais de saúde. *Esc Anna Nery Rev Enferm*. 2012[cited 2016 Aug 05];16(1):172-7. Available from: <http://www.scielo.br/pdf/ean/v16n1/v16n1a23.pdf>.
2. Carvalho ACO, Soares JR, Maia ER, Machado MFAS, Lopes MSV, Sampaio KJAJ. O planejar docente: relato sobre uso de métodos ativos no ensino de enfermagem. *Rev Enferm UFPE online*. 2016[cited 2016 June 21];10(4):1332-8. Available from: <http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/7685>.
3. Paranhos V, Mendes M. Currículo por competência e metodologia ativa: percepção de estudantes de enfermagem. *Rev Latino-Am Enferm*. 2010[cited 2016 Aug 15];18(1):109-15. Available from: http://www.scielo.br/pdf/rlae/v18n1/pt_17.pdf

4. Abbas AK, Lichtman AH, Pillai S. *Imunologia básica*. 4ª ed. Rio de Janeiro: Elsevier; 2013.
 5. Bain BJ. *Células sanguíneas: um guia prático*. 5ª ed. Porto Alegre: Artmed; 2016.
 6. Bhattacharya S, Sinha J. *A textbook of immunology (basic, cellular and molecular approach)*. Calcutá: Academic Publishers; 2006.
 7. Avent ND, Reid ME. The Rh blood group system: a review. *Blood*. 2000[cited 2016 July 10];95(2):375-87. Available from: <http://www.bloodjournal.org/content/bloodjournal/95/2/375.full.pdf>.
 8. Rezende LCM, Santos SR, Medeiros AL. Avaliação de um protótipo para sistematização da assistência de enfermagem em dispositivo móvel. *Rev Latino-Am Enferm*. 2016[cited 2017 May 14];24:e2714. Available from: <http://dx.doi.org/10.1590/1518-8345.0898.2714>.
 9. Martins JCA, Mazzo A, Baptista RCN, Coutinho VRD, Godoy S, Mendes IAC, *et al*. A experiência clínica simulada no ensino de enfermagem: retrospectiva histórica. *Acta Paul Enferm*. 2012[cited 2016 July 10];25(4):619-25. Available from: <http://www.scielo.br/pdf/ape/v25n4/22.pdf>.
-