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## Practical Course in Pediatric Surgery ministered by students of an Academic League in Salvador- BA, Brazil

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### Abstract:

On the past few decades, medical student's interest in a surgical career has been decreasing. Academic Leagues are institutions linked to medical school, that are managed by medical students. Simulation is an educational technic based on tasks and reproduction of procedures through an artificial model. This article reports a practical course on Pediatric Surgery from students to students using simulation-based learning. A practical Course for 30 students (divided in five groups). Groups take turns on each proposed subject matter on pediatric surgery (acute abdomen, acute scrotum, bowel obstruction, obstructive jaundice and abdominal masses). Students received flowcharts on managing each syndrome. Before the course begins, a pretest was given to all students to evaluate performance on the subjects. At the end of the course the same tests were applied as an evaluation of learning for comparison. At the end a course evaluation chart was submitted. 25 students answered the evaluation chart and 21 of them answered both tests. Pretest grades ranged from 0 to 9,2, (4,1 average), posttest grades ranged from 3,5 to 10 (7,5 average) students' grades variated from 8% to 77% (34% average). The course was well evaluated by the participants regarding classes, organization, instructors and subject matter. All participants showed positive variation on test grades. Results suggests that simulation-based learning helps acquaintance with the subject matter. Academic leagues make students to learn with themselves and stimulate teaching, research and extension. We believe that courses like these can enhance students' interest for surgery.

**Keywords:** Pediatric Surgery. Practical course. Academic League. Simulation Based Learning.

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### INTRODUCTION

The surgical field has been losing its power of attraction among medical students on the last decades (Hoffmann, 2014). Only 5.6% of female students and 15.6% of male students choose surgery as a career in Germany (Hoffmann 2014). In Brazil, similar trends have also been shown, and a recent study showed that student's interest in surgery tend to decline even more during the internship period, when most of them opt to follow a specialty that would provide better quality of life (Souza 2015). In this context, poor quality of life, excessive working hours, and inadequate remuneration are some of the reason's students have been losing interest in surgery (Hoffmann 2014; Polk 1999). Although it is certain that some of these aspects, typical of a surgeon's

life, hardly will change in the following years, studies have pointed to a potentially modifiable determinant for poor interest in these specialties: lack of early exposure to surgery during medical school (Hoffmann 2014; Polk 1999).

In Brazil, one initiative to enhance exposure to surgery in early years of medical school is the creation of Academic Leagues by medical students. An Academic League is an institution linked to a medical school and comprised of a group of students with a common interest in a certain medical field or specialty. They develop activities such as lectures, simulations, research and clerkships related to their field of interest. These activities enhance their exposure to specific medical knowledge

and practice beyond of what the standard medical curriculum can provide them.

The academic leagues in Brazil play an important role in medical education (Tadao 2010). Many of the academic leagues work as an opportunity for students to have more clinical practice. Most of participants start on leagues during the first semesters of medical school (Tadao 2010). Leagues can benefit their participants in many ways. Early contact with patients allows students to get more outgoing in medical practice, developing faster a doctor-patient relationship. Medical students exercise their criticism, scientifically thought, management, leadership and ability to work as a group (Santana 2012).

In Salvador, one of the biggest capitals of Brazil, no medical school has a Paediatric Surgery discipline. Most students graduate with no knowledge on this matter. Many schools around Brazil are at the same condition. In this scenario, our group participated in the creation of the Academic League of Paediatric Surgery. Our aim is to provide students with early contact to Paediatric Surgery through the development of lectures and courses based on the simulation-based education method.

When teaching adults, simulation is a very reasonable option. According to the Adult Learning Theory the process of learning is based on experience, motivation, 'need to know', self-concept and readiness to learn (Jones 2015). A well-conducted simulation creates an ideal environment for learning, allowing students to get involved in the simulation as it was real. In addition, simulation is a safe mean to maximize training in a period as short as possible (Preece 2015).

In this article we aim to report an experience of a simulation-based course of Paediatric Surgery ministered by students of the Academic League of Paediatric Surgery. We also provide measures of satisfaction and learning among participants of the course.

## METHODS

The course was projected for a maximum of 30 participants, all of them medical students from any medical school and any period. The 30 students were divided in five smaller groups of 6 students, to improve quality of teaching. The groups were formed trying to group students by school period, in a way that students of the same year were in the same group. All students agreed to participate in the course.

A pre-test was applied to all participants before the course (S1), to evaluate their knowledge and performance on subjects covered by the course. Similarly, at the end of the course the same tests were applied again as an evaluation of learning for comparison. These tests were composed by 15 questions, covering 5 different

topics in Paediatric Surgery. In addition, students were not identified by any information in neither test.

After the pre-test, we divided the 5 groups of students between 5 different classrooms, to attend a 30-minute lecture -- ministered by an academic league student -- covering one of five topics on paediatric surgery:

1. Acute Abdomen
2. Acute Scrotum
3. Bowel obstruction
4. Obstructive Jaundice
5. Abdominal Masses

After lecture, students participated in a 30-minute simulation of surgical procedures related to the topic covered by the lecture. An academic league tutor supervised each simulation. After simulation, the group of students received a flowchart explaining the management of the condition and proceeded to a next classroom. Students rotated between classrooms until all topics had been covered and practiced.

The artificial model was elaborated by the league students (FIGURES 1, 2, 3, 4 and 5)



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

- Testicular Torsion Model for Acute Scrotum class – Made with an empty balloon filled with a cotton ball. Students were supposed to perform an orchidopexy (Figure 1).
- Necrotizing Enterocolitis Model for Acute Abdomen class – Made with cattle bowel, red and black ink. Students were supposed to perform an enterectomy of the necrotic segment (Figure 2).
- Wilms's Tumor model for abdominal masses class – Made with balloons, plastic and cardboard. Students were supposed to perform a nephrectomy (Figure 3).
- Colostomy model for Bowel obstruction class - Made with sponges and cattle bowel. Students we supposed to perform a colostomy (Figure 4)
- Kazai Procedure model for obstructive jaundice class – Made with cattle liver and bowel. Students were supposed to perform a portoenterostomy (Figure 5).

After passing through all the classrooms and answering the post-test, students were given a chart to evaluate the course (S2) on the following aspects: content, quality of artificial model, material, audio-visual resources, learning, organization and they also evaluate the instructor.

At the end, the academic league counted the test grades and course evaluation.

## RESULTS

25 students attended the course, although, just 21 answered both pre and posttest.

The pretest grades ranged from zero to 9 (median 6). Posttest grades ranged from 3.5 to 10 (median 9,5). The course was well evaluated by the students. Bowel Obstruction class had the highest evaluation, being well classified by all the students in every aspect. Regarding to

organization and location, the course was also well evaluated. In the last evaluation topic, students were required to perform a self-evaluation. The great majority of them (80%), reported great self-development during the course, whereas 20% classified their development as modest.

Participant's feedback comments were positive. Quoting some students: "Instructors with nice theoretical and practical domain, very practical content and satisfactory teaching method", "Fascinating classes", "Nice material", "Excellent approach", "Well trained instructors", among others.

## DISCUSSION

On the past few decades, medical student's interest in a surgical career has been decreasing. During surgical rotation, students get tasks as retracting or holding laparoscopic cameras and that might be a reason for lack of interest (Abbas 2015). It is important to expose medical student to simulation on surgery at the beginning of medical school. Active learning and early interaction with surgical field, may cultivate interest on them (Abbas 2015).

This article reports a successful simulation-based course administered by the Academic League of Pediatric Surgery. The course was successful on providing students with early exposure to pediatric surgery knowledge and surgical procedures. All students improved their knowledge in this field, as evaluated by tests applied. Each student reported a different benefit for itself. Students from lower periods had the opportunity to have an acquaintance with Pediatric Surgery and learned how to suture or tie surgical knots. Older students were able to learn surgical technique, diagnosis and management of those conditions.

In this course, tutors were Academic League's members who were trained as assistant instructors. Using medical students as instructors can provide cost-effective, one-to-one simulation training for other medical students (Hu 2015). In addition, instructors benefit on learning while they teach. Moreover, participants reported that they felt more comfortable on learning from colleagues. In this way, interest in surgical field may grow among students, while they have a pleasant experience (Hu 2015).

As in previous studies, we found an increased interest in surgery among course participants (Bauer 2016). Their satisfaction and feedback showed that while they were learning, students had a pleasant time. We believe that this kind of practical experience increase both knowledge and interest on the surgical field.

Recent advances in adult education points toward a student-direct learning model. Simulation helps to create a clear “need to know” in a safe controlled environment. Although it does not guarantee learning, simulation is a valid tool according to adult learning theory (Jones 2015).

Simulation was an important aspect of our course. We noticed that students got excited about the idea of operating. Although low cost models were used, a reality environment was created with proper paramentation and monitor bip sound. Students were able to understand the general aspects of procedures and learned basic surgical technique. All the students evaluated simulation as a nice and new kind of learning.

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### Conflict of interest and financial disclosure

The authors have no personal or financial conflicts of interest. All authors agree with the submission of this manuscript and declare that all them have approved it.

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