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Active Learning Methodologies in the Teaching of Surgical Principles

Jonas Augusto Ramos[1]*, Leticia Possas Spangler[2], Mirian Dienâ Pastorini Jurgilas[3]

[1,2]Department of Medicine, Federal University of São João Del Rei, Brazil.

[3]Coloproctologist, Surgery professor at Federal University of São João Del Rei, Department of Medicine, Brazil.

jonasaugustoramos@gmail.com

***Corresponding Author:** Jonas Augusto Ramos, Department of Medicine, Federal University of São João Del Rei, Brazil.*

Abstract

Active learning methodologies has been studied as an alternative to the passive transmission of the knowledge. Healthcare assistants have an essential role in the dynamics of the operation room. The work of the healthcare assistant in the operation room has become more and more complex over the years. In this context, training and improvement of healthcare assistance staff is essential, to prepare them to perform the different functions assigned within the routines of the operating room. To that effect, an extension project was developed to contribute to healthcare assistant's training in surgical principles, using specially developed material and active learning methodologies, such as roleplays, simulations, questions and clinical case studies for group discussions. There were 23 students that participated to the project. A test was applied before and after the project to evaluate the effectiveness of the method. The activities happened twice a week over four months. The mean of the correct answers in the exam applied before the project was 9,69±1,51, out of a total of 20 questions. In the exam applied after the four months of project, the mean of the correct answers was 12,43±1,52, p<0,001. There was an average increase of 2,74 correct answers in the post-test compared to the pre-test, representing an increase of 28.27% in the grade obtained by the students. Active learning methodology has obtained great results in the absorption and fixation of the knowledge.

Keywords: *Active-learning, Surgical Principles, Graduation.*

Introduction

In recent years, there has been ongoing debate in educational institutions and within the state health system, about Healthcare Education in higher education and the need to qualify professionals to act in accordance with the principles set forth by the Unified Health System (SUS).With that aim, the Ministry of Health has made efforts to integrate public policies to health services, and to relate the practical side of undergraduate courses to the assistance provided to the general public.*Teaching does not consist of imparting knowledge, but creating the possibilities for knowledge to be produced or built* (FREIRE, 2011).

Active learning methodologies as simulations and role play have been getting notoriety in education. These strategies seek to insert learners in the learning process through assisted and oriented practice.In the educational context, simulation may be defined as a situation created to allow people to experiment the representation of a real event, with the purpose of practicing, learning, evaluating, testing or understanding human systems or actions (JOYNER, YOUNG, 2006). Among the educational strategies based on simulations geared to teaching, roleplaying is one which presents the highest cost-benefit, given that it is enacted by students, under a tutor's supervision, without the need to hire and train actors (KURTZ, SILVERMANN, 2005).

Realistic Simulation (RS) consists of a new teaching alternative which encompasses not only technical skills, but crisis management, leadership, teamwork, clinical thinking in critical situations or those which may harm real patients.Thus, simulation is seen nowadays as another form of learning, through leads

to longer-term retention, besides being more pleasant and enjoyable than traditional teaching (IGLESIAS, PAZIN-FILHO, 2015).Van Merrienboer and Kirschner (2007) states that simulation is a technique, and not exclusively a technology which aims at replacing or amplifying an actual experience with supervision, but which replicates substantial aspects of the real world in an interactive environment.The basic idea underlying RS is to promote the integration of theoretical knowledge, as well as technical and attitudinal skills, encouraging students to coordinate all those competencies simultaneously, thus facilitating the application of what has been learnt to solving new problems.

Those skills needed by healthcare professionals should be developed through the undergraduate program, so that upon graduation those individuals may apply their competencies beyond the technical-scientific domain, and allow the content learnt to be transmitted and incorporated.

Healthcare assistants have an essential role in the dynamics of the operation room.Be it in pre-surgical care, during surgery or in post-surgical care, the efficiency of multiprofessional work is fundamental for the success of a surgical procedure and for the satisfaction and humanization of assistance to patients, as well as their full recovery (SILVEIRA et al, 2014). The work of the healthcare assistant in the operation room has become more and more complex, since it needs to integrate activities which involve the technical, administrative, assistance and family related areas (FONSECA, PENICHE, 2009).

Considering the risk posed to patients' health and life, operations must be conducted by teams with highly specialized training, so as to provide total safety in the assistance to patients, in consonance with recommendations of the World Health Organization (WHO) for safe surgery (GOMES, 2013). In this context, training and improvement of healthcare assistance staff is essential, and so is the upgrading of initial training, so as to prepare them to perform the different functions assigned to them within the routines of the operating room (GOMES, etal, 2013).

To that effect, an extension project was developed by the Medicine course of the Federal University of São João Del-Rei (UFSJ): "Teaching Surgical Principles to Healthcare Assistants - Applicability of Active Learning Methodologies in Healthcare". The aims of the project are: a) to contribute to healthcare assistant's training in surgical principles, using specially developed material and active learning methodologies; b) to engage undergraduate medicine students of the UFSJ in the exchange of knowledge and develop an awareness of the importance of multifunctional dialogue in the surgical practice; c) raise awareness in healthcare assistants trainees on the importance of knowledge and evidences which underlie the protocols followed by professionals of the area.

Materials and Methods

The project was implemented at the UFSJ, Dom Bosco campus, from March 2018 to December 2018, under supervision of the Surgery tutor of the Medicine Course, with students of the fourth (final) term of the Healthcare Assistant course of the Federal Institute Southeast of Minas Gerais - São João Del Rei Campus.From a total of 25 students in the group, 23 participated in the project.

Specially designed materials were developed by the assistant students of the medicine course, under the supervision of the tutor and project manager, to be used by the students of the healthcare assistance students. The materials consist of a booklet containing surgical principles, written by the assistant students and the tutor, with photos taken by them of the surgical instruments of the Surgical Techniques laboratory of the UFSJ - Dom Bosco Campus, and theoretical-practical classes based on active learning methodologies, such as roleplays, simulations, questions and clinical case studies for group discussions in class, upon previous reading of the material made available. The work of planning and development of the booklet was done by the assistant students, later revised by the supervising tutor, enabling the former to develop and practice the ability to design a teaching project in the area of surgical techniques.

The materials produced were made available to the healthcare assistance students, and covered topics such as: concepts, techniques, nomenclature and purpose of surgical instruments, dressings, asepsis techniques, scrubbing and surgical clothing, infections in surgery, surgical stages, incisions and surgical positions, needles and threads, sutures and drains, wound healing and post-surgical care, among others. Students were guided to do the pertinent previous readings before activities scheduled in agreement.

A total of 25 activities were implemented with the students, with diverse themes contained in the materials developed, and implemented in theoretical-practical sessions through simulations, discussions of clinical cases previously studied, roleplays and laboratory training, besides seven days of fieldwork, under the supervision of the medicine teacher assistants and of the supervising tutor, a surgeon, in actual surgeries at the local hospital, where the students already had practical training.The activities took place twice a week over four months, aiming at keeping a periodic pace in the learning process, for the best learning results.

In the first contact, the students, who had already sat the surgery course during their undergraduate program, took a theoretical test consisting of 25 multiple choice questions with an overall high level of complexity - only a few questions had average or low level of difficulty, in order to assess the knowledge obtained by them during the undergraduate program, before the start of the project.Four months after the last session, the test was applied again to participant students, to assess improvement in knowledge and retention.

The data obtained underwent a descriptive analysis with the aid of statistical program SPSS 15.0, considering a significance level of 1%.The mean and standard deviation of the variables was taken into account.

A term of consent for voluntary participation in the project was duly presented and signed by all students taking the course.

Results and Discussion

From the analysis of the 23 tests taken by the students who completed the project, it can be observed that the average number of correct responses in the pre-test (taken before the start of the project) was 9,69±1,51 out of 20 questions.The post-test, however (taken after the 4 months of the project) had an average of 12,43±1,52 correct responses (Table 1), $p<0.001$. An increase of 2.74 correct responses on average can be observed between the pre-test and the post-test, representing an increase of 28.27% in the total mark obtained by the students.

Another relevant aspect is that all the 23 students obtained a certain degree of progression in their marks, getting an additional 2 correct responses at least (10% of the total questions) in the post-test, compared to the pre-test (Table 2).

In the satisfaction survey on the course, all students reported a feeling of increased confidence on their mastery of the content after the four months of the course.

Table 1. *Mean and standard deviation of the marks obtained by the 23 students in the tests taken before and after the project.*

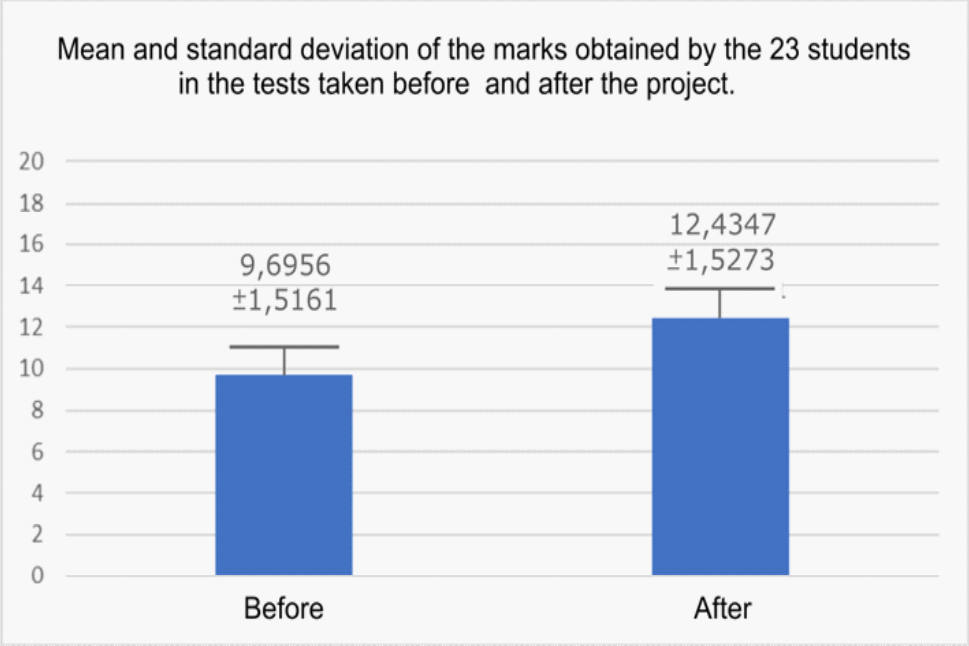
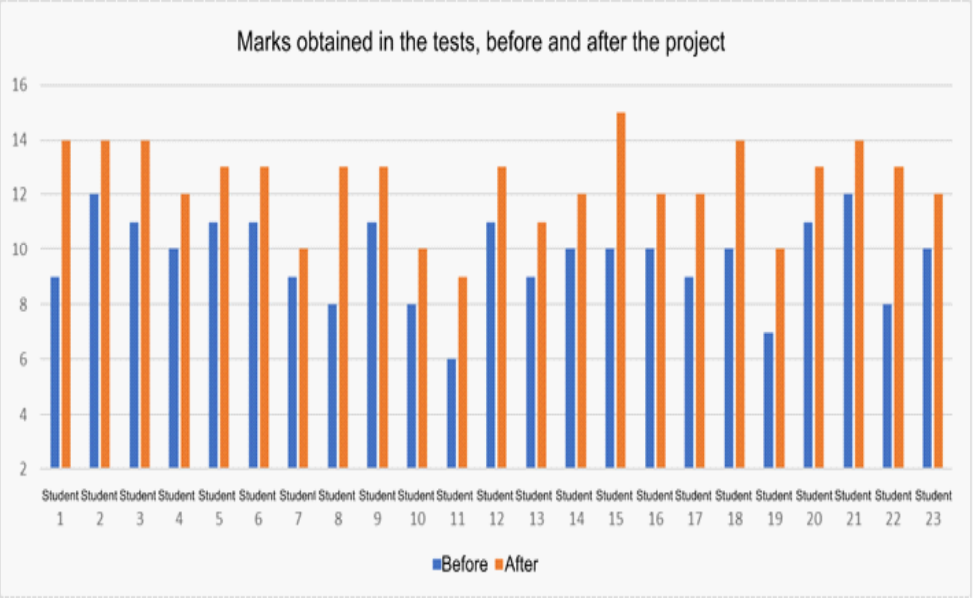


Table 2. *Marks obtained by each one of the 23 students in the tests with 20 objective questions, taken before and after the project, respectively.*



The project evidenced a marked improvement, with statistical difference ($p<0,01$) not only in the average marks obtained by students in the post-test, as related to the pre-test, but also individual improvement of all participant students, without exception, with low standard deviation of the average results. It suggests that active methodologies are the best form to promote knowledge acquisition when compared to lecture-mode sessions, seminars and other "classic" teaching techniques, since the students already had the surgical principles course in their program, previously the project.

It must be highlighted that students had already taken the surgical principles course in their program, and yet obtained very low marks in the first test.In the post-test, however, after being exposed to active methodologies and field work in order to consolidate and improve their knowledge, 78% of the students (18 students) managed to reach 60% of correct responses in the test.Considering the level of difficulty of the test, the improvement in students' knowledge is even more evident.

In addition to the other benefits of active methodologies in relation to passive learning, with higher levels of consolidation of knowledge and higher levels of learning in the long term, a possible reason for the improvement in the number of correct responses is the higher level of interest of students in dynamic and challenging classes, with examples, discussion of cases and practice, instead of the predictable and passive lecture-mode sessions.

Conclusions

The course described here was very useful for the students of the Healthcare Assistant program in the city of São João Del Rei. Improvement was noticed not only in the marks obtained in the final test, but also in students' perception of improved knowledge by the end of the course.They felt more confident and apt to act in the job market, performing the tasks assigned to them in the operating theatre and wards with increased dexterity and engagement.The teaching assistants involved also benefited from the course, developing their ability to teach, to apply different techniques such as simulations and roleplays, to mediate group discussions in clinical cases and to retain knowledge in the area of surgery.

Active methodologies have been more frequently used by professional in the healthcare field, and have proven to be more effective than the so-called passive learning techniques for learning and retention. Although there are other studies on active teaching methodologies in several courses in the healthcare field, the present study was a pioneer in surgical principles, showing the efficacy of the methodology also for the teaching of theoretical-practical content, besides the previously studied efficacy in the retention of theoretical content.

Further studies are needed to provide more evidence on the applicability of active teaching methodologies in the different areas of healthcare courses.More incentive and professional training are needed to enable these techniques, which represent the future of teaching in healthcare, to be more widely applied and spread in teaching institutions.

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