

# Anaesthesia and Intensive Care Residents' Perception of Simulation Training in Four Romanian Centres

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## ABSTRACT

**Introduction:** Simulation training offers an opportunity to educate anaesthesia and intensive care (AIC) residents safely. At present, it is not yet a mandatory part of residency curriculum.

The **aim** of the study was to evaluate the residents' perception of the inclusion of simulation-based training in the Romanian AIC residency program.

**Material and methods:** Romanian AICs in anaesthesia and intensive care from four training centres completed a twenty-question survey regarding their views on simulation during their residency training. Residents were divided into junior, in the first three years, or senior groups, in the last two years of residency training. The questionnaire included Likert-scale multiple-choice, open-ended, and "yes" or "no" questions regarding simulator learning, the frequency of simulation sessions, and the value of the simulation sessions in improving practice, skills or teamwork. The open-ended questions, asked which were the respondents' preferred topics to be included in simulation sessions.

**Results:** Fifty-six percent of residents completed and returned the questionnaire. Ninety-eight percent of them considered simulation-learning useful once a month or every three months especially in the first two years of training. All residents thought simulation sessions would improve their skills, communication abilities, and teamwork. Senior residents paid more attention to clinical scenarios ( $p=0.007$ ), haemodynamic monitoring ( $p=0.017$ ) and mechanical ventilation ( $p=0.004$ ) as compared to juniors. All residents considered difficult airway management, and cardiac life support to be very important issues to be included in simulation sessions.

**Conclusion:** The survey demonstrated that simulation-based training should play a greater role and eventually become compulsory in training program in AIC academic centres.

**Keywords:** residents' perception, anaesthesia and intensive care, training, survey, simulation

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## INTRODUCTION

Simulation technology is increasingly used in medical education to increase patient safety. Medical simulation is a tool used to mimic a real situation not only for educational purpose but also for evaluation of professional competence [1].

During residency, simulation training adds value to training programs by offering residents the opportunity to acquire skills and practice scenarios in a safe and realistic learning environment without jeopardising patient safety [2,3]. It allows skills to be practised and to be repeated at any time during training progress

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as well as postgraduate courses. Unlike traditional lectures, medical simulation provides a means to assess knowledge, skills, and communication capabilities and integrate these into a clinical context [4,5].

Simulation-based medical education has grown significantly worldwide and is now an important part of many anaesthesia training programs [6-9]. However, residents' perception of simulation programs has been evaluated in only a few reported studies [4,10,11].

The aim of the present study was to assess Romanian anaesthesia and intensive care residents' perception of simulation training as a potential compulsory part of their medical education taking into consideration that such programs have been only recently introduced in some of academic training centres. This is the first study to evaluate Romanians anaesthesia and intensive care residents' perception on the simulation training.

## ■ MATERIALS AND METHODS

Program directors from four Romanian anaesthesiology training centres, Cluj-Napoca, Târgu-Mureş, Bucureşti, and Iaşi were contacted and invited to take part in the survey. The invitation included a web link to the online survey, was e-mailed to program coordinators who distributed the documents to all residents on their departmental e-mailing list.

All Romanian anaesthesiology and intensive care residents from the 1<sup>st</sup> to 5<sup>th</sup> years of training who were listed on each of the four university's departmental e-mailing lists were included in the study and invited to complete the questionnaire. There were no exclusion criteria.

Residents in their first to third years of residency training were considered "junior residents", and residents in their final two years of residency training were considered "senior residents".

The survey was electronically distributed on March 2015 to all residents and was made available for completing on line for three month, from March 1<sup>st</sup> to May 31<sup>st</sup>, 2015. Three reminder e-mails were sent to program coordinators from all 4 centres during the 4<sup>th</sup>, 8<sup>th</sup> and 11<sup>th</sup> weeks of online survey availability.

### Questionnaire development

A twenty-question survey was developed to collect information from residents, regarding the perception of the role of simulation in their residency training. The

residents were invited to complete a fifteen-minute voluntary, anonymous survey using the Google Forms online platform.

The questionnaire was designed based on a literature search and author's personal experience. The literature search was limited to human and English language articles. MEDLINE (1964 to March 2015) and EMBASE (1978-March 2015) were searched using terms "medical simulation", "anaesthesia simulation training", "high-fidelity simulation", and permutations thereof.

Prior sending to respondents, the questionnaire was analysed by all four program coordinators.

The survey was not piloted on anaesthesia residents before sending the questionnaire.

The questionnaire included Likert-scale multiple-choice responses, open-ended questions and "yes" or "no" questions.

For multiple-choice questions, the respondents were asked to indicate their agreement with each statement ranging from strongly agree to disagree strongly. Each response received a numerical value: strongly agree (1), agree (2), disagree (3), strongly disagree (4) and don't know (5).

Multiple-choice questions included issues such as:

- usefulness of simulator learning
- most appropriate time for simulation during the 5<sup>th</sup> year training
- the option of the inclusion of simulation as a mandatory part of residency curriculum
- the frequency of the simulation sessions during an academic year
- the value of the simulation sessions in improving practice skills
- communication capabilities and teamwork.

For the open-ended questions, the respondents had to give their preferred topics to be included in future simulation sessions.

The questionnaire included demographics, previous experience in the medical volunteering field, medical experience abroad and driving license.

The questionnaire can be found in Appendix 1 (available as Electronic Supplementary Material).

### Statistics

Statistical analysis was performed using MedCalc Statistical Software 16.2.0 (MedCalc Software bvba, Ostend, Belgium). Quantitative variables, such as the

resident's age, are presented as medians (interquartile range). Qualitative variables were presented as frequency and percentage. Comparisons between the frequencies of two or more variables between junior and senior resident groups were made using chi-square test or Fisher t exact test, accordingly. P values are compared with the "set"  $\alpha$  value.

For certain multiple choice questions, raw data were presented as percentages of respondents "agreeing", "disagreeing" or "don't know" with the statements, according to the Likert scale used.

Open-ended responses were divided into categories from which a "Top 5" most frequent categories of responses in both groups of residents, junior and senior, was developed.

## RESULTS

### Demographics

The questionnaire was distributed to 215 residents.

- 44 residents from University of Medicine and Pharmacy "Iuliu Hațieganu" Cluj-Napoca, Regional Institute of Gastroenterology - Hepatology "Prof Dr O Fodor" Cluj-Napoca;
- 49 residents from University of Medicine and Pharmacy Târgu-Mureș;
- 92 residents from University of Medicine and Pharmacy Iași
- 30 residents from University of Medicine and Pharmacy "Carol Davila", Elias Emergency University Hospital, Bucharest.

One hundred and twenty-two residents completed the questionnaire (56.7%).

None of the residents enrolled in the study had previously participated in simulation sessions as a part of residency curriculum.

The response rate from all centres was presented in Figure 1. Responses by year of training and gender are shown in Figure 2.

Responders, age expressed as median, and the 25th and 75th percentile was 28 (26-30). One-third of the responders were males, and two-thirds were females.

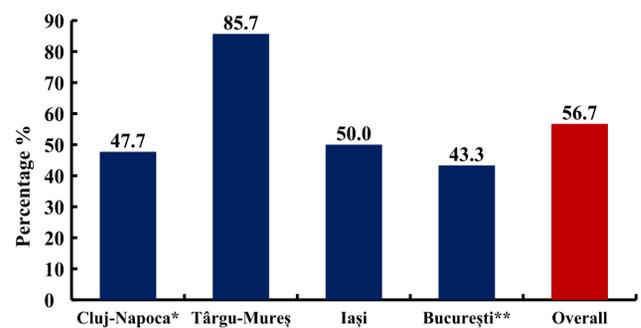
### Resident's perception on simulation training

Ninety-eight percent of respondents answered "yes" to the question "do you consider simulator learning useful during residency training?" Junior and senior residents

(45.9%) believed the simulation sessions are most useful during the first three years of residency training.

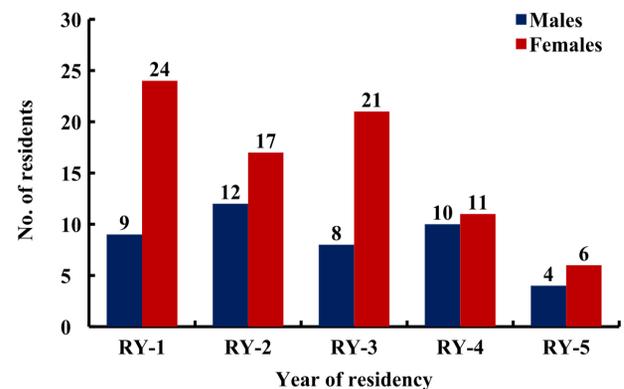
The simulation sessions were considered useful only during the first year of training by 35.2% of all responders (Figure 3).

Regarding the frequency of the simulation sessions during an academic year, 68% of responders considered the optimal interval for simulation session was once a month or every three months (Figure 4). Forty-eight percent of senior residents felt once a month the most appropriate time for simulation session compared to junior residents.



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Fig. 1. Residents' response rate from all training centres



RY- residency year of training.

Fig. 2. Residents' response rate by residency training level and gender

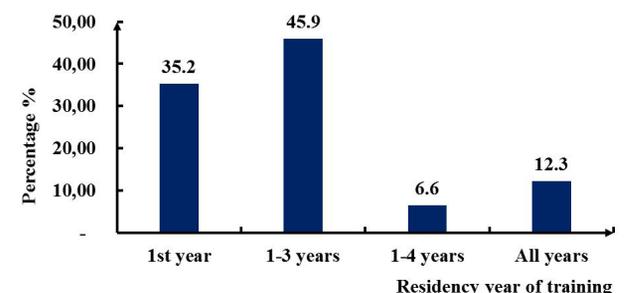


Fig. 3. The most appropriate time for simulation sessions during residency training programme

Eighty-seven percent of all respondents answered positively to the question “should simulation education courses be mandatory in the anaesthesia and intensive care core curriculum?” Only 9% of all responders disagreed with the statement.

Ninety-eight percent of responders indicated that simulator training would improve their practice of safe anaesthesia, skills, communication abilities, teamwork, and consolidate their theoretical knowledge.

Regarding the preferred method for improving skills, abilities and theoretical knowledge, 60% of responders considered simulation session to be the preferred method compared to information provided by the internet, films or videos. (Figure 5).

The proposed simulation scenarios of primary interest to the respondents are given in Figure 6.

The “top five” topics ranked by junior residents included:

- difficult airway management (20.9%)
- basic and advanced cardiac life support (13.2%)
- general and regional anaesthesia techniques (12.1%)
- clinical scenarios (6.6%); (5) hemodynamic monitoring (4.4%)
- For senior residents, the top 5 topics were:
- difficult airway management (35.5%)
- general and regional anaesthesia techniques (25.8%)
- basic and advanced cardiac life support (25.8%)
- clinical scenarios (25.8%); (5) hemodynamic monitoring (19.4%)

Senior residents were more interested in complex topics such as mechanical ventilation (p=0.004), haemodynamic monitoring (p=0.017) and clinical scenarios (p=0.007) (Figure 6).

## DISCUSSIONS

Traditionally, anaesthesia and intensive care residency training consisted of oral lectures and presentations, case presentations and performing procedures on patients under supervision. However, simulation presents a more efficient training tool for acquiring the necessary skills to perform invasive procedures and non-technical skills; such as team working, situation awareness, decision making, and task management [4,6]. Simulation allows educators to create training exercises

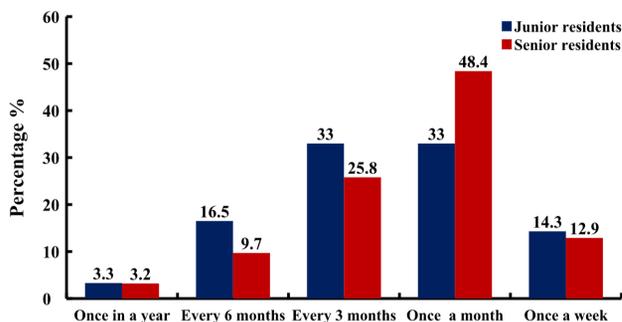


Fig. 4. Optimal schedule for simulation sessions during an academic year as suggested by respondents

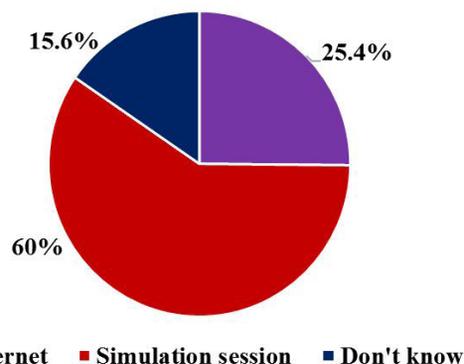
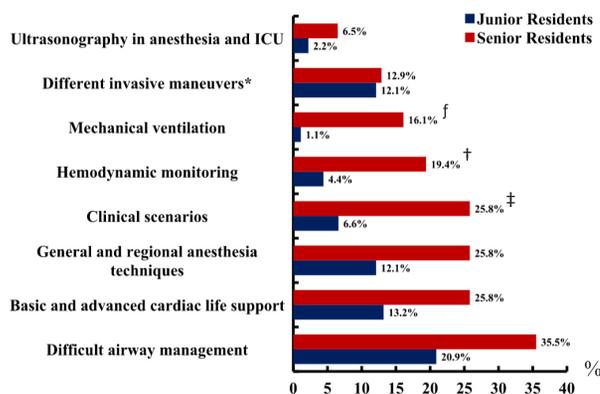


Fig. 5. Learning method preferred for improving skills, abilities, knowledge



\* Different invasive manoeuvres included peripheral and central venous catheterization, thoracocentesis, and other basic manoeuvres in anaesthesia and intensive care. <sup>f</sup> p=0.004, <sup>†</sup> p=0.017, <sup>‡</sup> p=0.007

Fig. 6. Description of the preferred topics for simulation session. Results were expressed as a percentage of responders for every topic reported to a total number of responders in each group (junior or senior)

in an environment that reduces patient safety concerns and permits repetitive practice [1,4,6].

The major barriers in simulation training worldwide is a lack of funding (50%) and lack of faculty resources (27%), even in developed or developing countries.

The benefits are experimental learning (66%) and the management of critical or rare events (37%) [2]. Anaesthesiology residents trained on simulators were found to responded more quickly and performed procedure more efficiently [12].

In the present survey, the perception of residents regarding the importance of simulation-based learning during their five years training was evaluated, even though they had no educational experience with high-fidelity simulation. From the academic centres contacted for the survey, two out of the four, Cluj-Napoca and Târgu-Mureş respectively, have included practical skills and medical simulation centres for undergraduate and postgraduate students and resident medical staff.

The residents' responses were in favour of this learning method. They considered simulator training as a tool to improve their practice, skills, communication abilities, teamwork, consolidate their theoretical knowledge.

In accord with the current data, Canadian anaesthesiology residents considered simulation-based education valuable for enhancing their capacity to deal with emergency situations [10], though they found training with high-fidelity simulation as an anxiety provoking experience.

Cardiac life support and airway management were considered the top two preferred topics for simulation sessions by both Romanian and Canadian junior residents, though malignant hyperthermia and obstetrical emergencies were the main two subjects preferred by senior Canadian anaesthesia residents [10].

Unlike Canadian residents, Romanian senior residents preferred simulation session on haemodynamic monitoring, clinical scenarios, and mechanical ventilation to a larger extent than junior residents. A possible explanation for this result may be the differences in infrastructure among different ICUs and operating rooms and differences in methods of training between centres.

Care should be taken in generalising the results of the present study as the four centres may not be entirely representative of Romanian anaesthesia and intensive care training centres for residents, though there are only two other such centres in Romania.

The overall response rate was 56.7%, despite three attempts to encourage the non-responders to complete the questionnaire. However, the overall response rate is

similar to other studies [13] and higher than a previous published international survey [10].

In conclusion, the study found that most participating residents considered it useful to have simulation-based training. Based on these findings, program coordinators should consider introducing simulation as mandatory during residency in Romania.

## ■ CONFLICT OF INTEREST

None declared.

## ■ ACKNOWLEDGEMENT

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