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Young RAES Minimally Invasive Surgery Training and Education Survey in Romania

Nicoleta Leopa[1]*, Cătălin Pîrîianu[2], Silviu-Tiberiu Makkai-Popa[3], Stefan Paitici[4], Octavian Enciu[2], Ruxandra Marian[5], Sandu Aprodu[6], Flaviu Ionut Faur[7], Horea Bocse[8], Alina Puscasu[9], Draga Maria Mandi[10], Florin Turcu[11], Răzvan Cătălin Popescu[1], Cătălin Copăescu[11], Clarisa Bîrlog[11]

[1]Department of General Surgery, Emergency Hospital of Constanta, Romania
[2]Department of Surgery, Elias Emergency Hospital, Bucharest, Romania
[3]Unirea Medical Center, Brasov Hospital, Romania
[4]3rd Department of General Surgery, Emergency County Hospital, Craiova, Romania
[5]Provita Medical Center, Bucharest, Romania
[6]Department of General Surgery, Emergency Hospital of Targu Mures, Romania
[7]2nd Surgery Clinic, Pius Brinzeu Clinical Emergency County Hospital, Timisoara, Romania
[8]Department of Surgery, Regional Institute of Gastroenterology and Hepatology, Cluj-Napoca, Romania
[9]2nd Department of Surgical Oncology, Regional Institute of Oncology, Iasi, Romania
[10]Department of Surgery, Coltea Hospital, Bucharest, Romania
[11]Ponderas Academic Hospital Bucharest, Romania

***Corresponding author:**
Nicoleta Leopa, M.D.
Department of General Surgery
Emergency Hospital of Constanta
No 145 Tomis Boulevard, 900591
Constanta, Romania
E-mail: gherghe_nicoleta02@yahoo.com

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Rezumat

Educație în chirurgie minim invazivă în România: sondaj Young ARCE

Introducere: chirurgia minim invazivă este chirurgia prezentului şi a devenit un standar de aur pentru majoritatea patologiilor. Pregătirea chirurgilor în tehnicile minim invazive este obligatoriu necesar să se efectueze din timpul programului de rezidențiat. În România nu există un program național de pregătire chirurgicală minim invazivă, de acest aspect fiind preocupate doar universitățile şi anumite spitale universitare. Scopul acestui studiu a fost de a evalua nivelul de pregătire chirurgicală minim invazivă la nivel național şi de a identifica preocupările medicilor rezidenți şi a tinerilor specialişti în specialitățile chirurgicale.

Material şi Metodă: echipa Young-ARCE a conceput un chestionar online confidențial cu 25 de întrebări care analizează pregătirea chirurgicală minim invazivă individuală şi necesitățile tinerilor medici chirurgi. Chestionarul online a fost trimis tinerilor chirurgi din România membri şi non-membri ARCE şi a fost distribuit pe rețelele de socializare. Toți tinerii

chirurgi, indiferent de specialitate (vârsta < 40 de ani) au fost invitați să participe în perioada decembrie 2023 – ianuarie 2024.
Rezultate: un total de 197 de respondenți din 9 centre universitare au participat la sondaj. Majoritatea respondenților (55.3%) şi-au descris poziția actuală de medic rezident, 94.4% lucrează într-un spital public. Doar 20.3% au beneficiul de a avea un centru de simulare laparoscopică în instituția în care îşi desfăşoară activitatea, iar 63.5% au urmat o formă de pregătire individuală în tehnicile minim invazive. Majoritatea respondenților au efectuat prima intervenție chirurgicală după anul 3 de rezidențiat, cea mai frecventă procedură fiind colecistectomia laparoscopică. Indiferent de distribuția în funcție de gen, cei mai mulți dintre respondenți au dorit o durată mai mare de 1 an dedicată pregătirii minim invazive din timpul programului de rezidențiat.
Concluzii: acest sondaj național subliniază necesitatea programelor de instruire în chirurgia minim invazivă, cu structură şi programă comună şi cu posibilitatea evaluării periodice individuale, importanța promovării instruirii chirurgicale fiind obligatorie pentru îmbunătățirea rezultatelor postoperatorii.

Cuvinte cheie: educație chirurgicală minim invazivă, laparoscopie, curbă de învățare, sondaj național

Abstract

Introduction: minimally invasive surgery is the surgery of the present and has become the "gold standard" for the most pathologies. The training of surgeons in minimally invasive techniques is mandatory required to be carried out during the residency program. In Romania, there is no national minimally invasive surgical training program, only universities and certain university hospitals are concerned with this aspect. The aim of this study was to assess the level of minimally invasive surgical training at the national level and to identify the concerns of residents and young specialists in surgical specialties.
Material and Method: the Young-RAES team designed a confidential 25-question online questionnaire that explores the individual minimally invasive surgical training and needs of young medical surgeons. The online questionnaire was sent to young surgeons from Romania, RAES members and non-members, and was distributed on social networks. All young surgeons, regardless of specialty (age < 40 years), were invited to participate in the period December 2023 – January 2024 on the survey.
Results: a total of 197 respondents from 9 University Centers participated in the survey. The majority of respondents (55.3%) described their current position as a resident doctor, 94.4% working in a public hospital. Only 20.3% have the benefit of having a laparoscopic simulation center in the institution where they work, and 63.5% have followed some form of individual training in minimally invasive techniques. Most respondents performed their first surgical intervention after the 3rd year of residency, the most common procedure being laparoscopic cholecystectomy. Regardless of gender distribution, most respondents wanted more than 1 year of minimally invasive training during their residency program.
Conclusions: this national survey emphasizes the need for a training program in minimally invasive surgery at the national level, with a common structure and program and with the possibility of periodic individual evaluation, the importance of promoting surgical training being mandatory for improving postoperative results.

Key words: minimally invasive surgical education, laparoscopy, learning curve, national survey

Introduction

The development of technology in the last three decades has brought significant improvements in the operative management of surgical patients and has greatly improved the quality of patients life, as well as long-term survival (1,2). Currently, minimally invasive surgery (MIS) has become the ”gold standard” for multiple chronic and acute pathologies, being widely spread (3).

Therefore, in a field where open surgery education still predominates, the new generation of trainees now has greater access to minimally invasive surgery (MIS) training programs. As a result, they are learning and performing laparoscopic surgery at an increasing rate (4,5).

The learning curve for open surgical techniques is shorter compared to laparoscopic techniques. Young surgeons face the challenge of learning, mastering, and practicing various surgical approaches (6). The acquisition of clinical and surgical skills historically depended on an expert trainer, but nowadays this custom has been overcome, the "surgeon of tomorrow" emphasizing self-taught (7,8). The current training of young surgeons is based on a multitude of coefficients: thorough theoretical training, practical courses, mentoring, while the most important element remains individual training (9). This attitude seems to have more consistent results, offering comfort and confidence to young surgeons who can perform surgical maneuvers already practiced in a simulated environment, without exposing patients to great risks (6,7,9).

The introduction of MIS revolutionized modern surgery, creating a global demand for trained surgeons skilled in minimally invasive techniques for various pathologies (10). Moreover, laparoscopic surgical training is in a continuous evolution, and the introduction of training courses in the residency curriculum of young surgeons should be a global practice (11).

In Romania, early training in MIS was primarily an individual effort. However, the inclusion of laparoscopic training in surgical residency programs has significantly contributed to the wider adoption of these techniques (12).

The Romanian Association of Endoscopic Surgery (RAES) has supported this process by fostering cultural changes, facilitating training for young surgeons, and implementing programs to standardize minimally invasive techniques in underserved areas. Even during the COVID-19 pandemic, RAES successfully managed to guide surgeons to maintain a minimally invasive approach (13).

Despite clear progress from changes in the general surgery residency curriculum and ongoing support from RAES, a significant concern raised by young surgeons remains - educational programs in MIS in Romania still have substantial room for improvement. The Young RAES taskforce, formed in 2023 serves as a bridge between junior members of the surgical community and experts in the field. Its goal is to create a platform for young Romanian surgeons to access mentorship, education, and networking opportunities for career development in minimally invasive surgery, while also engaging with the international surgical community through collaboration. The group is open to all RAES members under 40 or those who have completed their surgical residency within the last five years. As part of this mission, the taskforce started with an assessment of the needs and concerns of young surgeons in Romania.

The aim of this study was to assess the concerns and needs of young surgeons in Romania and to evaluate the current level of their training in minimally invasive surgery (MIS). Specifically, the study sought to understand the challenges they face in acquiring the necessary skills, identify gaps in the existing training programs, and determine what resources or improvements could better support their professional development in MIS. By addressing these issues, the study aims to contribute to the enhancement of surgical education and the overall quality of minimally invasive procedures in Romania.

Material and Method

In December 2023-January 2024, a confidential questionnaire was developed and distributed by the Young-RAES committee to young surgeons in Romania. The questionnaire was addressed to resident doctors and young medical specialists under the age of 40, in surgical specialties in Romania, regardless of RAES membership.

The survey included 25 questions with binary or multiple answers, as well as questions with free answers. The questionnaire included information on demographic data, current work position, information on professional training and MIS education. The survey was conducted in Romanian and it is available by using this link https://shorturl.at/i9KNO for the online version or the link in the reference (14).

Statistical Analysis

For statistical analysis, (Statistical Package for Social Sciences) SPSS version 18 (IBM Corp.; Armonk, NY, USA) was used. Results are presented as mean ± standard deviation or medians with range. The categorical variables were expressed as count (percentage) and Mann-Whitney tests were performed to check for differences between groups. A p-value < 0.05 was considered an indication of statistical significance. The comparative analysis of the respondents according to the surgical specialty was carried out dividing the young surgeons from the General Surgery specialty and other specialties (Gynecology and Urology).

Results

A total of 197 young surgeons from Romania participated in the survey. Of these, 150 were registered Young-RAES members, meaning 77.7% of the respondents were affiliated with RAES. *Fig. 1* illustrates the distribution of responses based on the respondents' university training centres. A total of nine university centres participated in the study, with most respondents (37.1%) coming from Bucharest.

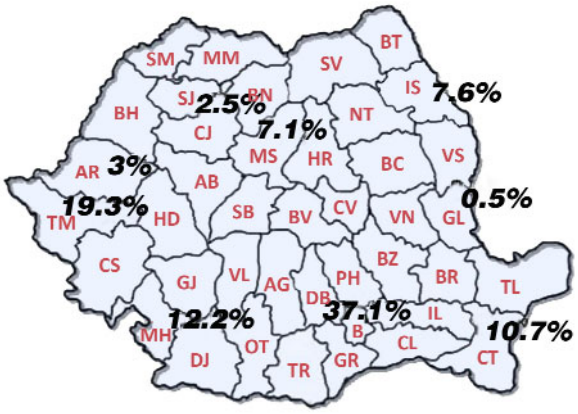

Figure 1. Distribution of respondents by University Training Centers

(*Fig. 1*) The data of the respondents regardless of the training center or current training status are summarized in *Table 1.*

The age of the respondents varied between 24 and 40 years with an average of 31.8 ± 4.1.

Table 1. Respondent characteristics

Variables	Respondents (n=197)	Percentage (%)
Age**(y)	31.81±4.07 (24-39)	
Gender		
Male	102	51.8
Female	95	48.2
Current position		
Resident	109	55.3
Consultant	88	44.7
Specialty		
Surgery	172	87.3
Gynecology	20	10.2
Urology	5	2.5
Working place		
Public hospital	186	94.4
Private hospital	7	3.6
Public and Private	4	2
Hands-on training center in your institution		
No	142	72.1
Yes	40	20.3
Unknown	15	7.6
LS of the team /year		
< 20	40	20.3
20-50	40	20.3
>50	117	59.4
Participation in hands-on courses	125	63.5
Wanted duration of the MIS module in residency		
6 Months	35	17.8
12 Months	86	43.7
18 Months	76	38.6

y: years; LS: Laparoscopic Surgery; MIS: minimally invasive surgery.
*Values are mean (standard deviation) (range).

The distribution according to gender was approximately equal (51.8% male versus 48.2% female). More than half of the participants in the study (55.3%) described their current position as a resident doctor, and the majority in General Surgery, followed by Gynecology and Urology. There were no responses from Thoracic or Pediatric surgery. Most of the respondents completed the residency program in a public hospital (94.4%), 72.1% having a MIS training facility in the institution where they carry out their activity. Approximately 40% of young surgeons work in teams that perform less than 50 laparoscopic surgeries per year. More than 60% of respondents attended at least one hands-on MIS course outside the curriculum. However, a longer internship in laparoscopic surgery is desired by most of the young surgeons to be included in the residency training curriculum (43.7% consider at least 12 months would be more appropriate, while 38.6% would prefer minimum 18 months).

The first laparoscopic surgery performed as the main operator was around the 3rd year of residency, with an average of 2.27 ± 1.674. There are also some respondents who have not yet performed a laparoscopic surgical intervention as main operators, most of them being in the first year of residency training (*Fig. 2*).

The most common surgical intervention performed as the main operator was the cholecystectomy (45.7%), followed by the appendectomy (22.3%) and diagnostic laparoscopy (17.8%). The least frequently performed were surgeries for colorectal pathology (0.5%). Other surgical interventions included: perforated gastric ulcer, hydatid cyst, perforated diverticulitis, liver abscess, peritoneal biopsy (*Fig. 3*).

The respondents' gender distribution is represented in *Table 2*. In the univariate analysis, the type of surgical specialty (p=0.002) and the workplace (p=0.036) emerged as significant factors influencing the results. The analysis of the data regarding the first laparoscopic surgery (2.22 ± 1.49 in male vs 3.31 ± 1.85 in female, p = 0.054) and participation in hands-on courses (69.6% in male and 56.8% in female, p = 0.063) had a low statistical significance. More male (8.8%) work in the private sector, compared to female (2.1%).

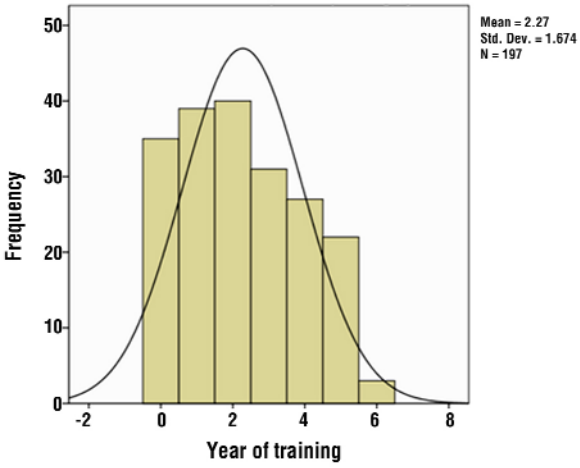

Figure 2. The distribution of cases according to the performance of the first laparoscopic surgery as the main operator and the year of residency training

The percentage of females in other surgical specialties was better represented compared to general surgery (GS) (76% vs 44.2%), similarly for the current position (68% doctors specialized in other surgical specialties, compared to 41.3%). More respondents from other surgical specialties (12%) carry out their activity in the private sector, compared to those from GS (4.6%, p = 0.040). The first laparoscopic surgical intervention was performed earlier by

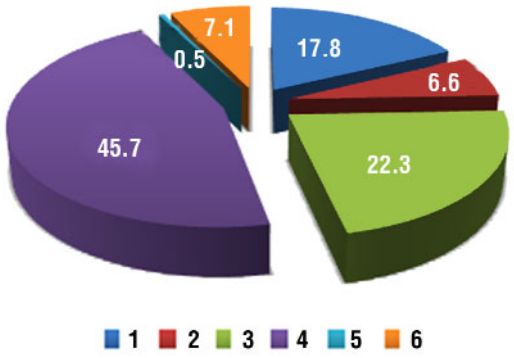

Figure 3. Distribution of cases according to the first laparoscopic surgical intervention performed as the main operator.
1) diagnostic laparoscopy, 2) parietal defects,
3) appendectomy, 4) cholecystectomy, 5) supra-tumoral colostomy, 6) other

Table 2. Comparison of respondent characteristics between genders

Variables	Male (n=102)	Female (n=95)	p-value
Age*(y)	32.09 ± 4.11 (24-39)	31.51 ± 4.02 (24-39)	0.336
Current position			0.485
Resident	54 (52.9)	55 (57.9)	
Consultant	48 (47.1)	40 (42.1)	
Surgery Specialty			0.002
General Surgery	96 (94.1)	76 (80)	
Other (Gynecology/Urology)	6 (5.9)	19 (20)	
Experience* (y)	5.26 ± 2.05 (1-10)	4.80 ± 2.26 (1-10)	0.449
Working place			0.036
Public	93 (91.2)	93 (97.9)	
Private	5 (4.9)	2 (2.1)	
Public+Private	4 (3.9)	0	
First Laparoscopic Surgery (y)*	2.22 ± 1.49 (1-6)	3.31 ± 1.85 (1-6)	0.054
Participation in hands-on courses	71 (69.6)	54 (56.8)	0.063
Wanted duration of the MIS module in residency			
6 Months	18 (17.6)	17 (17.9)	
12 Months	50 (49)	36 (37.9)	
18 Months	34 (33.3)	42 (44.2)	

Y: years. With percentages in parentheses unless indicated otherwise,
*Values are mean (standard deviation) (range).

general surgeons ($p < 0.001$), all of them preferring the laparoscopic approach more frequently in the emergency (88.4% vs 60%, $p < 0.001$). Respondents from other surgical specialties opted for participation in hands-on courses in a significantly higher percentage compared to GS (80% vs 61%, p=0.049) (*Table 3*).

Table 3. Comparison of respondent characteristics between specialties

Variables	General Surgery (n=172)	Other (Gynecology+Urology) (n=25)	p-value
Age*(y)	31.87 ± 4.14 (24-39)	31.40 ± 3.51 (25-39)	0.235
Gender			0.002
Male	96 (55.8)	6 (24)	
Female	76 (44.2)	19 (76)	
Current position			0.012
Resident	101 (58.7)	8 (32)	
Consultant	71 (41.3)	17 (68)	
Experience* (y)	4.97±2.16 (1-10)	5.56±2.10 (1-10)	0.077
Working place			0.040
Public	164 (95.3)	22 (88)	
Private	4 (2.3)	3 (12)	
Public+Private	4 (2.3)	0	
Laparoscopy simulator in the hospital			0.577
No	122 (70.9)	20 (80)	
Yes	36 (20.9)	4 (16)	
Unknown	14 (8.1)	1 (4)	
Laparoscopy simulator in the University			0.227
No	107 (62.2)	12 (48)	
Yes	46 (26.7)	11 (44)	
Unknown	19 (11)	2 (8)	
First Laparoscopic Surgery (y)*	2.24±1.60 (1-6)	3.52±2.12 (2-6)	< 0.001
Participation in hands-on courses	105 (61)	20 (80)	0.049
Laparoscopic approach available in emergency	152 (88.4)	15 (60)	< 0.001
Wanted duration of the MIS module in residency			
6 Months	28 (16.3)	7 (28)	
12 Months	77 (44.8)	9 (36)	
18 Months	67 (39)	9 (36)	

Y: years. With percentages in parentheses unless indicated otherwise,
*Values are mean (standard deviation) (range).

Discussion

Surgical education and surgical training programs have shown an increasing evolution during the last years, undergoing multiple changes (15). In this sense, several countries have chosen to upgrade their surgical training program and introduce modern methods of training doctors in minimally invasive surgery. Some countries have adopted a mandatory residency training curriculum for doctors in surgical specialties (16).

Interest in the laparoscopic technique was recorded in Romania from the 50s-60s, after 1990 laparoscopic surgery was introduced on a large scale and consistent training for this type of approach became a necessity.

At the national level, several minimally invasive surgery training centers have been established that have helped spread surgical techniques, from basic introductory concepts to advanced laparoscopic and robotic surgery techniques (17).

The Romanian Association for Endoscopic Surgery, founded in 2001, aims to initiate and organize programs, specific activities and training, and improvement courses for doctors in the areas of interest of the association, permanent training and surgical education being the foundations (13).

According to data from the specialized literature, structured educational programs offer the possibility of a good surgical education, a dynamic assessment of the learning curve, allowing young doctors to have the possibility of evolution without thinking about the costs of such a program (17,18). Investing in surgical education allows increasing the relevance of surgical education, subsidizing such programs being important and visible in increasing the quality of the medical care and the patients' quality of life (18).

The medical world of the last decades has registered a higher number of female gender graduates, compared to the male gender, and the number of female resident doctors in surgical specialties has increased in a significantly high percentage (19). The opportunities for women have improved also in Romania, according to the current study, both women and men having the possibility of performing a surgical intervention during approximately the same residency period (19). The respondents' gender distribution represented in Table 2 suggests that the type of specialty and the environment in which the surgeons practice may play a crucial role in shaping their experiences, concerns, and training needs.

The univariate analysis showing the type of surgical specialty ($p=0.002$) and the workplace ($p=0.036$) as significant factors indicates that variations in responses were strongly associated with the specific surgical specialties of the participants and their respective workplaces. Further analysis could explore these relationships in more depth to better understand how they impact the development of young surgeons in Romania.

The development of virtual environments for surgical education has represented a special effort for researchers in the field, offering the possibility of more and more performing applications for improving the medical act (20). Theoretical training, virtual simulation and exercise on a model give resident doctors greater confidence and security to perform a surgical procedure, which leads to an increase in the safety of the operative act and consequently better postoperative results (21).

In Romania, formal training in laparoscopy has two levels: basic and advances skills. Since 2018, given the adjusted curricula, surgeons who finish general surgery residency are considered to have a basic level and officially receive a certificate of basic level laparoscopic surgeon. This certificates that these surgeons have the knowledge and technical skills to perform a cholecystectomy and an appendectomy. For all the other procedures it is recommended to have a certificate of advanced laparoscopic skills, after another 2 months course and an examination that includes theoretical and practical evaluation. However, there is a discrepancy between is expected from residents to do related to laparoscopic surgery and what they do, according to our observations in this study.

The minimum training requirements for basic laparoscopic skills are as follows: observing at least 10 laparoscopic procedures, assisting as a scrub nurse in at least 30 procedures, operating the camera in at least 30 procedures, serving as the second assistant in at least 30 procedures, performing at least 5 diagnostic laparoscopies, 5 cholecystectomies, and 10 appendectomies. Although it might not seem too much, 40.6% of the respondents work in teams with less than 50 laparoscopic procedures (*Table 1*), making it impossible to reach the recommended volumes. When it comes to advanced laparoscopic skills, there is a significant gap filled with limitations that hinder practical training opportunities for young surgeons. Implementing a fellowship system could be a more effective solution for addressing these challenges and improving training

The limitations of the study consist in the differences in surgical training of each university center, the study proving that surgical training is different depending on specialty and gender. Another limitation of the study is the small number of respondents from surgical specialties other than general surgery.

The sample of 197 participants might not fully represent all young surgeons in Romania, especially given that certain regions and surgical specialties are underrepresented. This could limit the generalizability of the findings. Another limitation is that the study relies on self-reported data, which may be subject to recall bias, inaccurate reporting, or subjective perceptions of training quality and experiences. A logbook review might be a more accurate method of measuring some of the parameters.

Being a cross-sectional study, it captures data at a single point in time, making it difficult to assess how laparoscopic training evolves or to determine causal relationships. The effects of the changes in training practices or the curriculum could not be captured. Training conditions might vary significantly between different hospitals, teams or training centres. Given the geographic variability of participants, the results may not reflect the full spectrum of training experiences across Romania.

We also acknowledge a potential response bias: participants who choose to respond may have a stronger interest in laparoscopic surgery, leading to a potential bias in the results, while those less engaged in the subject may be underrepresented.

Conclusions

Despite the limitations of the study, it is reasonable to conclude that a vast majority of young Romanian surgeons do not have access to training facilities, making it difficult to reach the recommended volumes required for proficiency. At the same time, they are willing to extend the period of MIS training to compensate this reality and participate in related courses outside the curricula.

Investing in surgical education and creating training opportunities is crucial for enhancing its relevance and improving the quality of medical care. Subsidizing these programs leads to better-trained surgeons, ultimately improving patient outcomes and quality of life.

Author's Contributions

All authors made an equal contribution.

Conflicts of Interests

The authors have no funding and conflicts of interest to disclose.

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