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Current challenges and future needs of clinical and endoscopic training in gastroenterology: a European survey

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ABSTRACT

Background and study aims A universal European training program in gastroenterology and hepatology is currently not available. The European Board of Gastroenterology and Hepatology (EBGH) has produced guidance regarding expected competencies for European gastroenterology trainees but it is unclear whether these have been incorporated in national curricula. The aim of this study was to provide an in-depth assessment of training and research opportunities, professional activities and of socioeconomic aspects of gastroenterology training across Europe through a web-based 90-point questionnaire.

Materials and methods Physicians in their last year or who had recently finished their training, from 16 European countries, were invited to answer the questionnaire.

Results A total of 144 physicians answered the survey. A minimum number of procedures is required before completing training in nine of 16 countries (56 %). Overall, European trainees dedicate a median of 12 months (IQR 6–25) of their training period to endoscopy and a median of 3 months (IQR 0–6) to ultrasound. Training in interventional endoscopy was not always exhaustive, as about 50 % of participants performed fewer of several interventional procedures than was recommended by EBGH, most participants did not perform endoscopic hemostasis or endoscopic mucosal resection, and nearly a half of participants had no access to pancreatobiliary endoscopy training. Finally, up to 13 % of residents complete their training without the supervision of a mentor.

Conclusion In this large European survey, deep gaps and considerable differences in several gastroenterology training activities were found both among and within 16 European countries. Homogenization of educational programs and training opportunities across Europe is therefore necessary.

Introduction

Although diagnostic and therapeutic opportunities in gastroenterology have increased considerably over the last decades, their availability is still not homogeneous worldwide. A recent survey of digestive health across Europe showed relevant differences in the management of patients with gastrointestinal disorders among European countries [1].

Exhaustive training programs are one of the keystones for the long-term success of healthcare delivery, as they allow its refinement according to actual health needs by providing qualified physicians. In this regard, differences in postgraduate training are the most relevant reasons for a non-homogeneous healthcare offer in Europe.

To date, a universal European training program in gastroenterology and hepatology is still not available. The European Board of Gastroenterology and Hepatology (EBGH) has released guidance regarding expected competences for European trainees in gastroenterology [2] but it is unclear how these are strictly applied in common practice and as to whether they have been incorporated in national curricula [3]. Recently a European gastroenterology examination has been launched, however, this is mainly based on the gastroenterology training curriculum in the UK and may not be representative of the training experience in the rest of Europe [4]. The last evaluation of gastroenterology training across Europe found relevant variability in several aspects of gastroenterology among 10 European countries, including educational and socioeconomic issues [5]. Moreover, criteria stated by the EBGH to complete the gastroenterology training were not fulfilled in several training centres.

The aim of this study was to provide an in-depth assessment of training and research opportunities, professional activities and of socioeconomic aspects of Gastroenterology training across Europe through a web-based 90-point questionnaire.

Materials and methods

Study design and development of the survey questionnaire

This was a prospective web-based survey designed to assess the characteristics of postgraduate gastroenterology training in different European countries. The working group that formulated the survey was composed of a task force including 11 current trainees from 10 different European sections of national gastroenterology societies across Europe.

A 90-point multiple-choice questionnaire consisting of five sections to investigate different aspects of gastroenterology training was designed by the working group during videoconference meetings.

The first section aimed to address general characteristics of postgraduate training in each country, including length, access, logbooks/portfolio, national programs to be followed, final exams or thesis, the occasion to have a training period abroad, the opportunity to do PhD within training, and involvement of non-academic centers in educational programs. The second section focused on exact number and type of practical or hands-on training activities, including ward, endoscopy, ultrasound, manometries, pH-metries, proctology, and gastrointestinal imaging. The third section explored the characteristics of theoretical training activities such as lessons and congresses, and research programs. The fourth section touched upon financial and employment issues, such as average monthly salary, chance of paid maternity leave, chance of paid shifts/duties/availabilities, and employment after training. In the final section, critical issues and pitfalls of educational program were addressed, including the trainees' confidence in managing several disorders and performing several activities, the educational areas which should be improved in the future, and the need for standardization of educational programs across Europe.

Distribution of questionnaire and collection of data

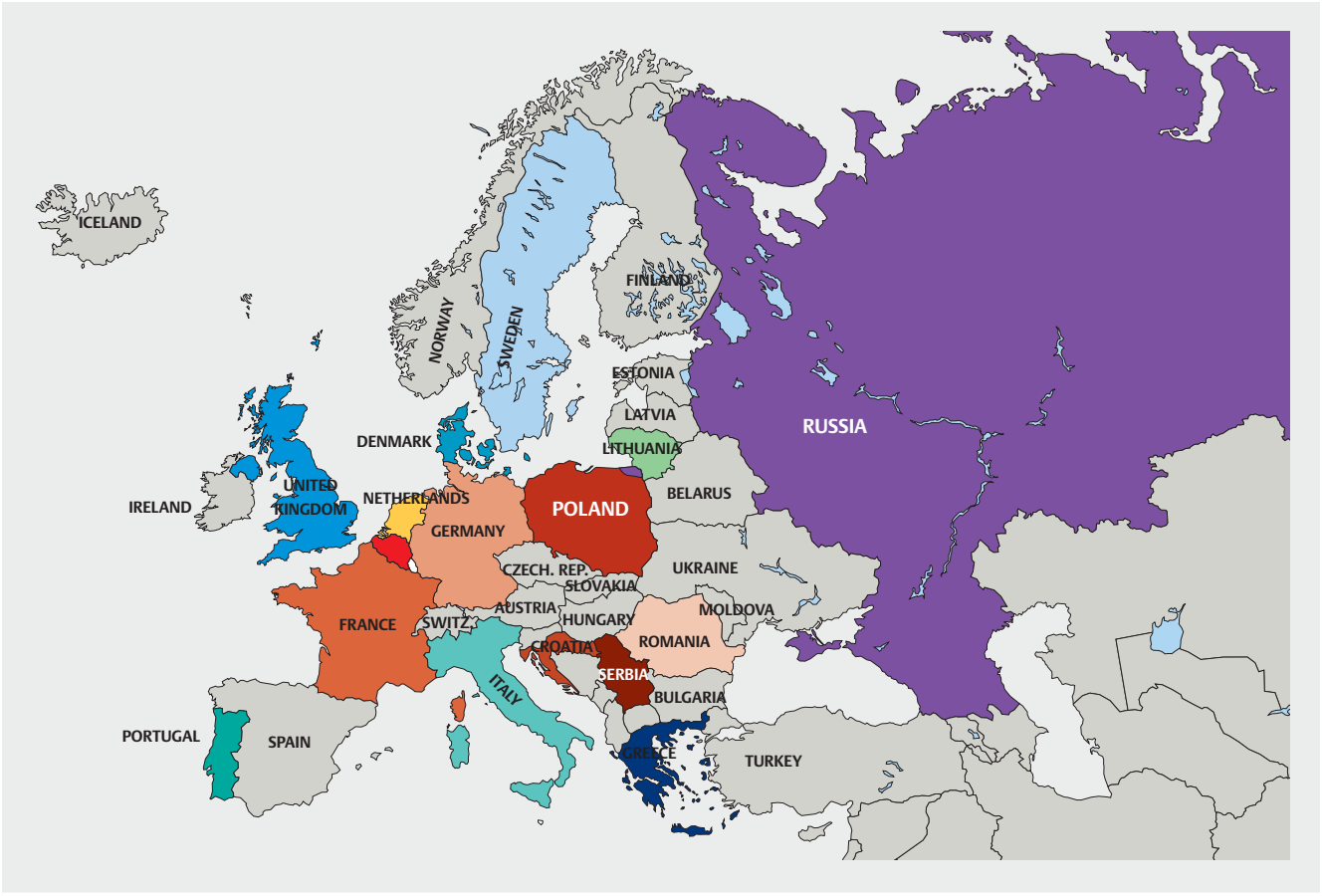
After approval by all components of the working group, the final version of the questionnaire was viewed via Google Forms. The link to access the questionnaire was sent via email, together with a brief explanation of the project (the full version of the questionnaire is available as **Supplementary File**), to senior gastroenterology trainees who were completing their final training year or young gastroenterologists who had recently (≤ 12 months before receiving the invitation) finished their training, from 75 cities within 16 European countries (Belgium, Croatia, Denmark, France, Germany, Greece, Italy, Lithuania, the Netherlands, Poland, Portugal, Romania, Russia, Serbia, Sweden, UK). In 10 of 16 countries (62 %) (Belgium, Croatia, Denmark, France, Germany, Italy, the Netherlands, Portugal, Sweden, UK), participants were identified through national societies/sections of trainees in gastroenterology/young gastroenterologists, while in other countries where such institutions were not available at the time of the enrollment, physicians were contacted directly. In two countries (France and UK), the participation requests were sent to all trainees within the newsletter e-mail of the trainees' society. When possible, we collected answers from at least one physician from each training centre of a specific country in order to have a comprehensive picture of gastroenterology training in Europe.

The ethics committee did not require approval for this type of survey. All subjects agreed to participate in the interview through an informed consent for collection, handling and storage of data, which was included in the presentation of the questionnaire. Data collection took place between March 2017 and March 2018.

All statistical analysis was performed using SPSS v. 20.0 for Macintosh (SPSS Inc., Chicago, Illinois, United States).

Results

A total of 144 trainees from all 16 European countries completed the survey (66.9 % of them attending the last year and 33.1 % of whom have just completed the post-graduate program). The included countries with number of participants were: Italy (29), Portugal (24), Denmark (13), France (13), the Netherlands (11), United Kingdom (10), Germany (10), Belgium (9), Croatia (8), Romania (7), Lithuania (4), Sweden (3), Greece (1), Poland (1), Russia (1) and Serbia (1) (▶ **Fig. 1**).



▶ **Fig. 1** European nations included in the survey: Italy, Portugal, Denmark, France, the Netherlands, United Kingdom, Germany, Belgium, Croatia, Romania, Lithuania, Sweden, Greece, Poland, Russia and Serbia.

General information and demographic data

Each country presented a median of 10 (IQR 6–20) university training centers, and in 86 % of cases non-academic centers were also involved in the educational programs. Most trainees (76 %) had the chance to spend a training period in a different national or international center. In all countries, physicians accessed the training program through a local or national selection with a written or oral exam, or both.

On average European trainees worked 40 hours per week (IQR 36–42) (▶ **Fig. 2**), plus a median of 6 hours per week (IQR 4–12) for night shifts, duties and availabilities.

Median length of specialist postgraduate training was 5 years (IQR 5–6), and in 13 of 16 countries (81 %) it also included a core period of internal medicine.

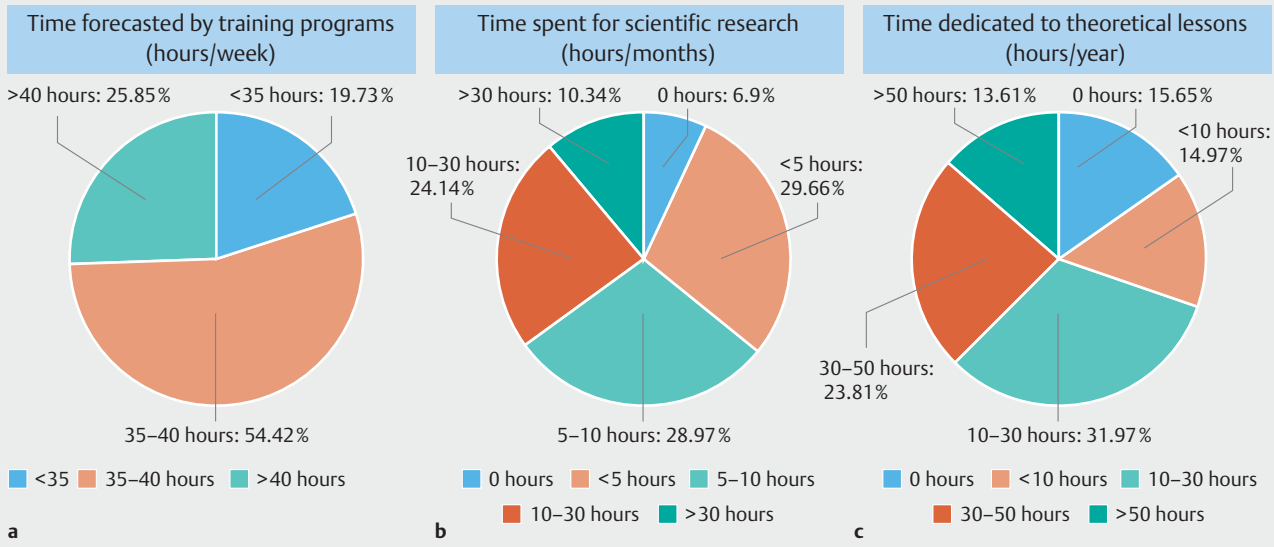
During the training period, most participants (75 %) had to record their theoretical and practical activities in a logbook (56 %), an electronic portfolio (36 %), or through other systems (8 %). In nine countries (56 %), a minimum number of practical procedures was required to successfully complete the training. In 11 countries (69 %) physicians had to undergo a final exam to complete their postgraduate training and only one-third of them had to complete a thesis before the final exam.

Practical training activities

Practical activities were found to be a core component of the gastroenterology training, although major differences exist among different centers within the same country.

On average, 12 months (IQR 6–25) during the entire training program were dedicated to endoscopy, with great variability among participants (range 3–48 months), and trainees performed 580 esophagogastroduodenoscopies (EDS) (IQR 300–1000, range 0–3000) and 400 colonoscopies (IQR 150–800, range 0–2500) during training, with relevant differences among centers and/or countries. Physicians from Denmark, France, Lithuania, Poland, Romania, Russia, Serbia, and Sweden performed a median number of procedures (EDS or colonoscopy) lower than the minimum threshold of 200 that is recommended by the EBGH (▶ **Table 1**). Other diagnostic procedures such as enteroscopy and endoscopic ultrasound were not usually performed by participants during training in most countries.

Participants described a limited experience with interventional endoscopic procedures. Half of them had performed zero or < 50 polypectomies, < 30 hemostatic procedures in the upper gastrointestinal tract, and < 15 balloon dilatations, which are the minimum threshold suggested by EBGH (▶ **Table 2**). Endoscopic mucosal resection (EMR) and endoscopic submuco-



▶ **Fig. 2** Overall time dedicated to training program (**a**), scientific research (**b**) and theoretical lessons (**c**).

sal dissection (ESD) were sporadically performed (▶ **Table 2**). Nevertheless, major differences existed among European countries, because in some countries, the average number of interventional procedures exceeded the suggested threshold, while in other countries it was far below the minimum standard recommended by the EBGH (▶ **Table 1**).

Less than 30% of trainees had completed>30 hemostatic procedures for variceal and non-variceal bleeding in France, Belgium, Denmark, Italy, the Netherlands, Poland, Lithuania, Russia, and Sweden. Similarly,<20% of physicians performed >50 polypectomies in France, Denmark, Italy, Lithuania, Serbia, Romania, Russia, and Sweden. Moreover, half of trainees had access to training in pancreatobiliary endoscopy and did not perform any ERCP. However, trainees who had performed ERCP declared to have personally conducted or assisted in an adequate number of 150 procedures on average. Among countries where ERCP training took more commonly place, Germany, the Netherlands, Portugal, and UK were distinguished for a homogeneity among number of trainees involved and of procedures performed (▶ **Table 1**).

Ultrasound training was poorly provided in almost all countries, as indicated by trainees in this survey. Only a median period of 3 months (IQR 0–6) was dedicated to abdominal ultrasound training: 56% of participants performed fewer than 100 diagnostic exams, and 54% of trainees had never performed a liver biopsy. Most senior trainees (90%) had never performed a complex procedure such as percutaneous ethanol injection (PEI) or radiofrequency ablation (RFA).

Overall, trainees performed a median of 100 manometries (IQR 0–400), but 66% of those surveyed had performed none or <10 esophageal manometries and 88% of them none or <10 anal manometries. Interestingly, only 50% received training in proctology and in interpretation of gastrointestinal radiology imaging.

Finally, regardless procedure type, 19 of 144 trainees (13%) claimed to have completed their postgraduate course without the supervision of a mentor.

Theoretical training activities and research programs

In this section of the questionnaire we tried to assess the features of teaching and research activities. Trainees attended a variable percentage of structured teaching during their training. Overall, 15.5% did not attend any formal structured teaching sessions, 30% attended some (<10) structured teaching sessions per year and 86% <30 lessons per year (▶ **Fig. 2**). The countries reporting the lowest number of lessons attended were Germany and Portugal, while those with the highest number of lessons were Croatia, Denmark, Romania, Sweden, and UK.

Theoretical learning was complemented by attendance of a median of two (IQR 1–4) national courses and one (IQR 1–2) international congress. In 47.6% of cases, participation in conferences and congresses depended on acceptance of an oral/poster presentation on the trainees' research, and 51.7% of trainees had to personally finance congress-related expenses.

A total of 93.1% of trainees carried out research activities during training but the time spent in this setting was extremely variable (▶ **Fig. 2**). Surprisingly, more than 80% of participants reported carrying out research activities during their free time rather than during working time. Countries reporting the least number of hours spent in research were Croatia, France, Sweden, and UK, while those with the highest rate of research activity were Germany and Portugal.

Within a research group, generally trainees had different responsibilities including data collection (93.1%), manuscript writing (75.9%), statistical analysis (56.5%), study concept and design (47.6%).

▶ **Table 1** Overall number of diagnostic and interventional procedures performed during training by countries.

		Average number of total diagnostic procedures performed [means ± SD]					Percentage of trainees performing interventional procedures					Percentage of trainees very or fully confident in each field at the end of training					
Country of training (No. of participants)	**Length of post-graduate training (years)**	**Upper endoscopy**	**Colonoscopy**	**US**	**ERCP**	**EUS**	**>30 Hemostatic procedures for non-variceal bleeding**	**>30 Hemostatic procedures for variceal bleeding**	**>50 Polypectomy procedures**	**>10 EMR procedures**	**>30 PEG placements**	**Ward clinical activities**	**Outpatient clinic activities**	**Endoscopy**	**US**	**ERCP**	**EUS**
All countries (144)	4 ± 1.5	797 ± 649	519 ± 444	365 ± 757	38 ± 74	58 ± 125	15.9 %	20.0 %	47.3 %	13.5 %	30.0 %	30.4 %	50.7 %	48.0 %	19.5 %	1 %	1.7 %
Belgium (9)*	3	1217 ± 743	638 ± 468	377 ± 662	17 ± 28	0 ± 1	22.2 %	0.0 %	100.0 %	11.1 %	55.6 %	55.6 %	55.6 %	44.4 %	22.2 %	0.0 %	0.0 %
Croatia (8)*	2	1363 ± 630	688 ± 285	1100 ± 1028	19 ± 45	8 ± 17	100 %	62.5 %	100.0 %	62.5 %	50.0 %	87.5 %	87.5 %	87.5 %	75.0 %	12.5 %	12.5 %
Denmark (13)*	5	492 ± 516	176 ± 126	62 ± 115	0	0	15.4 %	7.7 %	15.4 %	0.0 %	0.0 %	84.6 %	84.6 %	75.9 %	7.7 %	0.0 %	0.0 %
France (14)*	4	358 ± 184	175 ± 116	82 ± 139	8 ± 28	33 ± 45	23.1 %	7.7 %	7.7 %	69.2 %	46.2 %	46.2 %	46.2 %	30.8 %	0.0 %	0.0 %	7.7 %
Germany (10)*	6	900 ± 673	430 ± 309	1840 ± 1704	55 ± 58	125 ± 176	70.0 %	40.0 %	60.0 %	20.0 %	70.0 %	90.0 %	90.0 %	70.0 %	90.0 %	0.0 %	20.0 %
Greece (1)	4	3000 ± 0	1200 ± 0	0	250 ± 0	0	100 %	100.0 %	100.0 %	100 %	100.0 %	100.0 %	100 %	100.0 %	0.0 %	100 %	0.0 %
Italy (28)*	4	510 ± 369	491 ± 401	269 ± 353	46 ± 125	72 ± 151	17.2 %	13.8 %	20.7 %	31.0 %	17.2 %	44.8 %	72.4 %	69.0 %	34.5 %	6.9 %	6.9 %
Lithuania (4)	4	109 ± 56	78 ± 39	225 ± 206	0	0	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	50.0 %	25.0 %	75.0 %	50.0 %	0.0 %	0.0 %
Netherlands (11)*	6	880 ± 378	705 ± 235	9 ± 20	52 ± 46	53 ± 50	27.3 %	0.0 %	90.9 %	72.7 %	45.5 %	100 %	90.9 %	90.9 %	0.0 %	9.1 %	0.0 %
Poland (1)	2	50 ± 0	150 ± 0	50	0	0	0.0 %	0.0 %	100.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Portugal (23)*	5	1340 ± 483	1002 ± 318	208 ± 174	79 ± 60	162 ± 184	91.7 %	58.3 %	95.8 %	95.8 %	79.2 %	95.8 %	87.5 %	91.7 %	29.2 %	8.3 %	37.5 %
Romania (7)	4	261 ± 88	104 ± 54	929 ± 979	23 ± 56	0	85.7 %	57.1 %	0.0 %	14.3 %	14.3 %	57.1 %	28.6 %	28.6 %	57.1 %	14.3	0.0 %
Russia (1)	2	0	0	0	0	0	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Serbia (1)	5	90 ± 0	20 ± 0	30	0	0	100 %	0.0 %	0.0 %	0.0 %	0.0 %	100 %	100.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Sweden (3)*	7	183 ± 126	67 ± 29	0	0	0	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	100 %	100.0 %	33.3 %	0.0 %	0.0 %	0.0 %
UK (10)*	5	1115 ± 750	660 ± 675	12 ± 38	39 ± 63	20 ± 63	70.0 %	60.0 %	60.0 %	70.0 %	80.0 %	90 %	90.0 %	70.0 %	0.0 %	10.0 %	0.0 %

DS (standard deviations); US (ultrasonography); EUS (endoscopic ultrasonography); ERCP (endoscopic retrograde cholangiopancreatography), MRE (endoscopic mucosal resection); PEG (percutaneous endoscopic gastrostomy).
* Physicians identified through national societies of gastroenterology trainees/young gastroenterologists.

▶ **Table 2** Overall number of interventional procedures performed during training.

	Average number of total interventional procedures						
	None	<10	10–30	30–50	50–100	100–200	>200
Hemostatic procedures for non-variceal bleeding	9.7%	22.1%	22.1%	17.9%	19.9%	7.6%	2.8%
Hemostatic procedures for variceal bleeding	19.3%	27.6%	25.5%	15.9%	9%	2.8%	0%
Polypectomy (lower gastrointestinal/upper gastrointestinal)	2.1%	11%	22.8%	13.8%	13.8%	11%	25.5%
Endoscopic mucosal resection (lower gastrointestinal/upper gastrointestinal)	39.3%	15.2%	17.2%	11.7%	11%	1.4%	4.1%
Endoscopic submucosal dissection (lower gastrointestinal/upper gastrointestinal)	87.6%	9%	2.1%	0.7%	0.7%	0%	0%
Balloon dilation (upper and lower tract)	33.1%	27.6%	21.4%	11%	6.9%	0%	0%
Percutaneous endoscopic gastrostomy (PEG)	17.9%	19.3%	20.7%	19.3%	18.6%	2.8%	1.4%
Endoscopic retrograde cholangiopancreatography (ERCP)	56.6%	7.6%	7.6%	4.8%	15.2%	6.2%	2.1%
Endoscopic ultrasonography (EUS)	58.6%	11%	6.9%	7.6%	4.1%	4.8%	6.9%
Liver biopsie s	53.8%	12.4%	16.6%	10.3%	5.5%	0.7%	0.7%
Percutaneous ethanol injection	90.3%	7.6%	1.4%	0%	0.7%	0%	0%
Radiofrequency ablation	89%	8.3%	1.4%	0%	0.7%	0.7%	0%

Financial and employment issues

Data collected on financial and employment issues show great variability across Europe. The average salary of a final-year trainee was 2000 € per month. In the Eurozone countries, the salary ranged between 1300 and 4070 € per month. In other countries, a low salary of less than 1000 € per month was reported in Lithuania and Romania, while a high salary between 4000 and 5000 € was reported in the UK, and the Netherlands.

In nine of 16 countries, the salary per month increases incrementally with each year of training experience. In 12 of 16 countries, trainees also receive additional payment for night shifts and on/off site on calls. In all countries, paid maternity leave was provided for females and regularly paid in 14 of 16 countries. Overall, 84% of trainees were employed within 1 year of the end of training, with an employment rate greater than 95% declared by two-thirds of the participants.

Critical issues and pitfalls of educational program

In this last section, we assessed the effectiveness of training in terms of confidence perceived by the physicians in managing gastrointestinal disorders or in performing procedures after completing their post-graduate training.

Overall, all trainees felt quite, very or fully confident in treatment of almost all gastrointestinal diseases except for anorectal diseases and nutrition, for which 50% of participants declared to be not confident or little confident. Regarding specific activities, 95% of trainees surveyed were confident in ward, outpatient clinical activities, and endoscopic diagnostic procedures. Two-thirds surveyed declared high or full confidence (▶ **Table 3**). In contrast, poor autonomy (no confidence or little confidence) was reported by 47.6%, 80% and 85.5% for ultrasound, EUS, and ERCP, respectively.

Wide variability in confidence levels was found among different countries. Countries with >70% of trainees declaring high or full confidence in endoscopic activities were Croatia, Denmark, Germany, Greece, Italy, Lithuania, the Netherlands, Portugal, and UK. Only in Croatia and Germany did >70% of trainees report high or full confidence in ultrasonography. Poor confidence in EUS and ERCP was observed homogeneously in all of Europe (▶ **Table 4**).

Moreover, only 7.6% of trainees surveyed reported that they were not confident in scientific research. At the end of questionnaire, we asked physicians which areas in their training program should be improved. Most of them agreed that it is necessary to significantly improve training in interventional endoscopy with a focus on EUS and ERCP, ultrasonography, functional disorders, proctology, nutrition, and interpretation of gastrointestinal radiology imaging. Finally, 86.2% of participants agreed with the need to achieve a standardized European training program.

Discussion

This large survey provides an update of the gastroenterology training landscape in Europe, collecting data from a greater number of countries. The answers provided by 144 trainees from 16 European countries showed considerable differences in different aspects of gastroenterology training programs and several areas of training are underrepresented.

▶ **Table 3** Overall level of confidence in performing clinical activities and practical procedures at the end of training.

	Not confident	Little confident	Quite confident	Very confident	Fully confident
Ward clinical activities	0.7 %	4.1 %	22.8 %	40.7 %	31.7 %
Outpatient clinic activities	0.7 %	3.4 %	22.1 %	46.2 %	27.6 %
Ultrasound (US)	26.2 %	21.4 %	24.1 %	18.6 %	9.7 %
Endoscopy	0.7 %	7.6 %	24.1 %	51 %	16.6 %
Endoscopic ultrasonography (EUS)	63.4 %	16.6 %	9.7 %	9.7 %	0.7 %
Endoscopic retrograde cholangiopancreatography (ERCP)	67.6 %	17.9 %	8.3 %	6.2 %	0 %
Other techniques	33.8 %	24.8 %	25.5 %	13.1 %	2.8 %
Research activities	7.6 %	37.9 %	25.5 %	18.6 %	10.3 %

▶ **Table 4** Level of confidence in performing clinical activities and practical procedures at the end of training, by country.

	Percentage of trainees very or fully confident in each field at the end of training					
Country of training (No. of participants)	**Ward clinical activities**	**Outpatient clinic activities**	**Endoscopy**	**US**	**ERCP**	**EUS**
Belgium (9)	55.6 %	55.6 %	44.4 %	22.2 %	0.0 %	0.0 %
Croatia (8)	87.5 %	87.5 %	87.5 %	75.0 %	12.5 %	12.5 %
Denmark (13)	84.6 %	84.6 %	75.9 %	7.7 %	0.0 %	0.0 %
France (14)	46.2 %	46.2 %	30.8 %	0.0 %	0.0 %	7.7 %
Germany (10)	90.0 %	90.0 %	70.0 %	90.0 %	0.0 %	20.0 %
Greece (1)	100.0 %	100 %	100.0 %	0.0 %	100 %	0.0 %
Italy (28)	44.8 %	72.4 %	71.4 %	34.5 %	6.9 %	6.9 %
Lithuania (4)	50.0 %	25.0 %	75.0 %	50.0 %	0.0 %	0.0 %
Netherlands (11)	100 %	90.9 %	90.9 %	0.0 %	9.1 %	0.0 %
Poland (1)	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Portugal (23)	95.8 %	87.5 %	91.7 %	29.2 %	8.3 %	37.5 %
Romania (7)	57.1 %	28.6 %	28.6 %	57.1 %	14.3	0.0 %
Russia (1)	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Serbia (1)	100 %	100.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Sweden (3)	100 %	100.0 %	33.3 %	0.0 %	0.0 %	0.0 %
UK (10)	90 %	90.0 %	70.0 %	0.0 %	10.0 %	0.0 %

US, ultrasonography, ERCP, endoscopic retrograde cholangiopancreatography; EUS, endoscopic ultrasound

In Europe valuable efforts have been made so far by the EBGH, which released the Blue Book of Gastroenterology, recently updated in 2017, that includes guidance regarding the expected competences of European trainees in gastroenterology [2]. Despite this attempt, ECGH criteria are not yet widely applied in common practice and current results of training programs are largely nonhomogeneous and variable.

For instance, according to the Blue Book, the training program should last at least 6 years, including a minimum of 1 year of common trunk in internal medicine. Nevertheless, only seven of 16 countries have training programs of 5 years or more.

Trying to understand the adherence with EBGH standards, we found that overall, the average number of endoscopic diagnostic procedures surpassed the minimum thresholds recommended by the EBGH, but in almost half of countries, the number of procedures performed by trainees was inadequate. Moreover, training in interventional endoscopy was not always exhaustive, as about 50 % of participants performed several interventional procedures at a lower frequency than that recom-

mended by EBGH and most participants did not perform common procedures such as endoscopic hemostasis, polypectomy or EMR. These data are in line with the results of a recent international survey showing that just half of the surveyed trainees had never received formally teaching on polypectomy technique, half of the most experienced trainees had never had training on removing large polyps of over 10 mm, and 64 % trainees had never been taught the principles of EMR [6].

Besides, ultrasound training appeared to be widely inadequate in almost all countries both for diagnostic and for interventional procedures. The time dedicated to ultrasound training was on average 3 months. A considerable number of trainees performed a low number of diagnostic ultrasonographies and most of them were not trained to perform any ultrasound-assisted percutaneous procedure.

Overall, except for diagnostic endoscopy, the number of procedures performed during training across Europe has a low adherence with minimum standards recommended by EBGH. Similarly, a recent survey carried out with the assistance of the American Gastroenterological Association (AGA) showed that many US trainees do not meet the required standards for several endoscopic procedures [7]. This could be due to a lack of training but could also be secondary to a lack of standardized certification.

Similarly, a recent observational study showed that in the UK, where endoscopy certification is administered by the Joint Advisory Group on Gastrointestinal Endoscopy (JAG) through a system via a national (JETS) e-portfolio, pre- and post-certification for trainees met national standards. This confirms that standardized certification such as the JAG is effective in achieving competency in endoscopy training, in a transparent and robust manner [8].

Currently, training skills assessment in gastrointestinal endoscopy is mainly focused on numerical thresholds, but this strategy presents some drawbacks that need to be discussed. First, a definitive consensus on adequate number of procedures required is absent. A recent systematic review showed poor agreement among 10 studies assessing the number of procedures needed to achieve adequate skills [9]. Second, numerical thresholds poorly reflect individual competences. Also, the most recent guidelines on competence in endoscopy provided by the American Society of Gastrointestinal Endoscopy (ASGE) and the American College of Gastroenterology (ACG) underline that “performance of an arbitrary number of procedures in no way guarantees competence” [10]. In addition, the previously mentioned survey also showed that quality indicators, especially ADR, received poor emphasis during training [7].

On the contrary, learning curves appear to be more effective for continuous assessment of trainees’ performance and, therefore, should be preferred. In that regard, two studies showed that self-assessment of competencies with the Rotterdam Assessment Form for colonoscopy (RAF-C) and for ERCP (RAF-E), with subsequent plotting and analysis of learning curves is effective for assessing competencies in endoscopy [11, 12]. Similarly, the trainers’ judgement through Direct Observation of Procedural Skills (DOPS) at regular intervals is useful for qualitatively monitoring skills, and their evolution over time [13].

Contrary to what can be expected, in our survey, up to 13 % of trainees completed their training without the supervision of a tutor guiding the trainee. These data are alarming, because mentorship has a key role in training, and it is also essential for educational, professional, and legal reasons.

Moreover, comprehensive training also requires exposure to scientific research, and collaboration with research teams is advocated during training. In this regard, we believe that research activities should be better implemented in training programs and integrated in daily work time.

The strengths of this study are represented by the analysis of a wide geographic area including many European countries and of participants, all of whom were senior trainees or newly graduated gastroenterologists. The study also has some limitations. First, in some countries, most participants had not been systematically invited, therefore introducing possible selection bias. Second, less than 30 % of invited participants answered the survey and, even if this percentage falls within the realms of a huge educational survey response rates, it could result in non-response bias, affecting the validity of results. Moreover, several European countries are not or poorly represented, as only a few trainees took part in the survey. Nevertheless, it must also be considered that collecting data from such a wide number of countries is difficult and achieving a higher response rate and a greater number of participants from all over Europe is uncommon.

Conclusion

In conclusion, this large survey showed considerable differences in different aspects of gastroenterology training programs both among and within a large sample of trainees from 16 European countries. The previous assessment of gastroenterology training in Europe was performed in 2002 by Bisschops et colleagues [5]. Even if the two surveys are not fully comparable, an evaluation of how training in gastroenterology has changed over time did emerge.

The number of endoscopic examinations seems to be stable over time in the absence of substantial differences. Of note, the number of ERCPs performed during training has not increased significantly compared to 2002, and many countries still do not offer specific training in ERCP. Conversely, training in other procedures such as ultrasound, manometry, ph-metry and breath tests, which had been provided in only 10 % to 19 % of training centers, is now more widespread and provided to over 93 % to 98 % of trainees, although the time spent learning these procedures and the number of examinations performed remains low. The huge difference in gastroenterology training activities among all the centers, already reported in 2002, is still present. Such dissimilarities may lead to disparities in quality of training and, consequently, of healthcare across countries.

Valuable efforts have been brought forward by EBGH in Europe and current educational programs are considerably improved compared to the past. Nevertheless, we believe that national regulatory authorities responsible for specialist training should provide for greater standardization of educational pro-

grams as well as more rigorous application of the Blue Book of Gastroenterology standards.

Finally, trainers should guarantee more extensive application of assessment tools with the use of learning curves. This would facilitate systematized and personalized training of gastroenterologist across Europe and help fill educational gaps.

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Competing interests

The authors declare that they have no conflict of interest.

[1] Italian Council of Trainees in Gastroenterology
[2] British Society of Gastroenterology, Trainees Section
[3] Youth Section of Croatian Society of Gastroenterology
[4] Working Group "Young Gastroenterology" of the German Society for Digestive and Metabolic Diseases
[5] Swedish Society of Trainees in Gastroenterology
[6] Association of the French residents in hepatogastroenterology
[7] Portuguese Society of Trainees in Gastroenterology
[8] Youth Section of Flemish Association of Gastroenterology
[9] Dutch Society of Trainees in Gastroenterology and Hepatology
[10] Trainee Society of the Danish Society of Gastroenterology and Hepatology

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