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Special Article

Definition of minimum procedures required to certify competence in gastrointestinal endoscopy using the Delphi method

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Abstract

Introduction: As part of the training framework for medical specialities, it is vital to provide an agreed list of the type and number of practices involved in the professional work of a given specialty. Thus, the purpose of this study is to define a list of minimum procedures to ensure competence in Gastrointestinal Endoscopy based on a structured and agreed upon process, as well as to explore the opinions of experts in gastrointestinal endoscopy on the training of endoscopy physicians in Argentina and the need to certify competencies.

Materials and Methods: a mixed-method prospective study was carried out using the Delphi method as a qualitative group research technique, followed by the implementation of a structured survey.

Results: The final consolidated list included 17 procedures considered essential for certification of competence in gastrointestinal endoscopy. Median was used given the range in the minimum number of procedures required to achieve competence. In the case of upper gastrointestinal endoscopy, the minimum number of procedures agreed was 200, while in the case of colonoscopy it was 150.

Conclusion: This list is a fundamental element to develop a national training framework in gastrointestinal endoscopy, as well as a competence certification program.

Key words: Professional competence, Gastrointestinal Endoscopy, Delphi technique.

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Introduction

Competency-based education focuses on the activities to be performed by the learner (1); in this regard, "professional activities" are those actions that define the identity of each medical specialty and are exclusive to it. Thus, the practice of each medical specialty is understood as a defined, delimited and recognizable activity, an observable part of the professional's actions and with a more limited scope than a professional activity (2).

As part of the training framework for medical specialities, it is vital to provide an agreed list of the type and number of practices involved in the professional work of a given specialty (2). In turn, the list of procedures includes sequenced, well-structured actions that should always be performed in the same way to obtain the same result and that have diagnostic, prognostic or therapeutic purposes. A practice may include one or more procedures, or none at all. They are not excluding categories. It is assumed that procedures are very structured practices, following a defined time-space sequence to achieve a very specific result and always involving the use of technological tools or equipment. Practices and procedures are observable within the professional activities of a specialty or field. These categories are identified as "practices" and "procedures" so that each specialty can recognize, determine or define those specific to its field, making the necessary modifications and inclusions when elaborating the learning framework to build the defined specialist profile.

Specifically, in the case of the gastrointestinal endoscopy specialty, there is international consensus on which practices are exclusive, as well as the minimum number of competencies needed to achieve competence. The European Union Blue Book (3) aims to standardize training in this specialty and includes a table of minimum endoscopic techniques. Likewise, the North American experience is described in the Guide of the American Society for Gastrointestinal Endoscopy (4) based on the guidelines agreed upon for this specialty and subsequent updates (5).

Thus, international consensus can be useful as references, but they require a validation process or adjustments to the specific contextual realities of each country. The development of a list of procedures and agreement on the minimum number of these procedures is a valuable tool for the training and certification of specialists.

There are different methods to achieve consensus agreements. Qualitative methods gathering the opinions of people specially chosen on the basis of their experience, skills or knowledge of the subject of interest (6). The Delphi method falls into this group. It is especially useful when there is a group of people ("panel of experts") who can offer reasonably robust views on the issues to be studied. This method was described by Dalkey and Helmer at the Rand Corporation around 1951 (Santa Monica - California), and consists of a series of sequential questionnaires or "rounds" of consultation with experts, with controlled feedback that seeks the most reliable consensus of the participants' opinions (7). The advantage is that it could be remotely done. The anonymity and ignorance about the answers of the rest of the panel of experts favors unbiased opinions (8).

Thus, the purpose of this study is to define a list of minimum procedures to ensure competence in Gastrointestinal Endoscopy based on a structured and agreed upon process, as well as to explore the opinions of experts in Gastrointestinal endoscopy on the training of endoscopy physicians in Argentina and the need to certify competencies.

Materials and Methods

a) Methodology

A mixed-method prospective study was carried out using the Delphi method as a qualitative group research technique, followed by the implementation of a structured survey. The process was accomplished as follows:

FIRST ROUND

The first round was qualitative, using brainstorming methodology to discuss the objective. Participants were asked to freely make a list of professional practices and their estimated minimum number. The minimum number of basic diagnostic procedures (upper gastrointestinal endoscopy and colonoscopy) considered necessary to be competent professionals was also requested.

In addition, a survey was used to request opinions on aspects related to the competency training process and data that allow to characterize the sample. The survey also asked whether they considered necessary the certification of competences through a program, the relevance of the minimum number of endoscopic procedures to certify competencies, among other opinions on training and certification in our country.

SECOND ROUND

The next round consisted of a structured questionnaire, in which, after the first round, researchers added suggestions from the literature and consolidated them with the output of the first round (9).

Thus, experts were asked to indicate the minimum number of basic diagnostic procedures, but a possible range was defined based on the results of the first round, from 100 to 300 procedures.

For each procedure, experts had to rate whether it should be included and, if so, the degree of importance according to a 5-point Likert scale: 1. Very important; 2. Important; 3. Neither important nor unimportant; 4. Not very important; 5. Not important.

They also had to choose a minimum number of procedures within the range provided to them.

b) Analysis

The list of procedures sent in the subsequent round, to reach consensus on the most appropriate items to be included in the final list, was consolidated from the responses from round 1 plus assumptions from the literature using a unified nomenclature.(3,5,10).

Determining the level of consensus: The RAND/UCLA (Research and Development-University of California) convenience method was used to determine the level of consensus (11,12).

This process, adapted to the context, involves three steps:

Step 1: Procedure Inclusion Analysis

Based on the percentage of positive responses to the question of whether the procedure should be included, agreement among experts was classified as: a) high agreement (>85-100%); b) medium agreement (≥60-85%); and c) low agreement (<60%).

Only those with high and medium agreement are considered to be included.

Step 2: Definition of its importance according to the degree of agreement

2.a: definition of the degree of agreement:

- Strong agreement: for an item to have a strong agreement, >85-100% of the experts' responses must be within a range of 2 consecutive points on the Likert scale.

- Undetermined agreement: for an item to have undetermined agreement, >85-100% of the experts' responses must be within a range of 3 consecutive points on the Likert scale.

- Disagreement: for an item to have disagreement, the experts' responses must be within a range equal to 4 points on the Likert scale.

2.b: definition of inclusion:

- Appropriate item: classified as strong agreement on points 1 and 2 of the Likert scale (Very important and important).

- Questionable item: an item is questionable when it was classified as strong agreement on items 2 and 3 (important and neither important nor unimportant) or 3 and 4 (neither important nor unimportant and not very important) of the Likert scale).

- Inappropriate item: classified as having strong agreement on items 4 and 5 of the Likert scale (not very important and not important).

Step 3: Definition of the minimum number of procedures

For this purpose, they were analyzed according to their means and medians. Consensus was considered to be reached when the responses show a standardized distribution.

c) Expert population

An "expert" has been defined as a "knowledgeable individual", such as a specialist in his or her field (12) or someone who is knowledgeable about a specific subject (13-15).

For the first open stage, 520 selected experts registered as members of *Asociación de Endoscopistas Digestivos de Buenos Aires -ENDIBA-* (Society of Gastrointestinal Endoscopists from Buenos Aires) were invited, and for the second stage, 74 experts were reached, also including members of *Asociación Argentina de Cirugía -AAC- (Argentine Society of Surgery) and* Sociedad Argentina de Coloproctología –SACP- (Argentine Society of Coloproctology).

Results

First Round

A total of 257 expert responses were received, representing a 48% response rate. Of these, 209 reported having completed a residency, 166 reported university teaching activity, and 68.5% of the sample reported current teaching activity in residencies.

The mean number of years of practice was 17.2 ± 11.2 with a median of 14.

The perception of the competency evaluation processes (Likert Scale) studied showed that experts agreed that there is great diversity in the training of endoscopy physicians in Argentina (mean and SD: 4.7±0.79), and that a program to certify competencies is necessary (mean and SD: 4.7±0.69), as a means to legitimize practice (mean and SD: 4.7±0.68). They

also agreed that the minimum number of endoscopic procedures is key to certify competencies (4.5±0.85), and that the requirements and evaluations for certification should be adjusted to the professionals' experience and background (4.3±0.93).

Consulted about the minimum number of practices of the basic procedures to be certified, they reported a 320.8 mean for upper gastrointestinal endoscopy (range 50-2500, SD 361.1); given the dispersion, the median was 200. For colonoscopy, similar results were reported with a 385 mean (range 50-2500, SD 464.1) and a 250 median.

The list of procedures suggested by the experts were added and consolidated looking for standardized nomenclatures, and compared with those suggested by the literature until a list of 28 procedures was obtained (Table 1). Likewise, the lowest and highest number suggested as the minimum number of practices to certify were considered as a range for the second round.

Second Round

41 experts responded in this round, which accounts for 16% of those who responded in the first round and is suitable to consolidate the relevance and number of procedures.

Regarding basic procedures for upper gastrointestinal endoscopy, they reported a mean of 204.9 SD ± 57.07 with a median of 200 and for colonoscopy a mean of 166.5, SD ± 54.66 with a median of 150.

According to the criteria defined, some procedures showed a low degree of agreement among experts, including the following: "echo-endoscopy" (17.1% agreement); "ERCP and ERCP with papillotomy and lithiasis extraction" (22% and 19.5% respectively); "intragastric balloon placement" (31. 7%); "endoscopic submucosal dissection" (34.1%), "endoscopic obliteration of varicose veins with cyanoacrylate" (56.1%); "endoscopic mucosal resection >20 mm" (58.5%); "gastric polypectomy" (58.5%). Another group of procedures were excluded as they reach an intermediate degree of agreement among experts.: radiofrequency ablation (63.4%); colonic polypectomy > 20mm (78%); placement of expandable prosthesis (stent) (82.9%).

A total of 17 procedures were obtained with a high degree of agreement which are shown in Table 2. Likewise, with respect to the number of recommended procedures, their means with their SDs as well as the medians and range are reported in the same table. Finally, Table 3 shows the final consensuated list of procedures with the number of minimum practices.

Discussion

The final consolidated list included 17 procedures considered essential for certification of competence in gastrointestinal endoscopy. Given the wide range of the minimum number of procedures reported to achieve competence, it was decided to use the median. In the case of upper gastrointestinal endoscopy, the minimum number of procedures agreed was 200, while in the case of colonoscopy it was 150.

The list of skills in a field of practice should be the result of agreement on the type and number of practices that characterize the professional work of a given specialty. A remote consensus method was carried out with the parameters defined by the literature, enabling the creation of a list of minimum necessary practices, appropriate to the national context, taking into account different visions and places of practice.

The Delphi method is a tool that allows one to reach the most reliable consensus on the opinion of a group of experts on a subject, after a series of questionnaires combined with controlled feedback (16). The use of this methodology is considerably linked to content validity (17), thus confirming the findings of this study. However, it should be noted that the method used has limitations, the main one was the time frame to reach consensus, as well as the possibility of the researchers imposing their own ideas on the group of experts (18). In our case, the main limitation encountered was the characteristics and number of the experts invited. Because of the wide variety of practice developed in different regions of our country, it was difficult to achieve a true representation of experts and, secondly, the loss of participants from one round to the next.

Regarding the size of the expert population, the literature provides a range of possibilities from 10 to 100 experts (19-23). In general terms, it is recommended that if the sample is homogeneous, 10-15 participants could be sufficient, while if the sample is heterogeneous, a larger number of participants may be needed (24), thus demonstrating that the group of experts recruited for this research far exceeded what was established. Adler and Ziglio (1996) have mentioned the four requirements of this method for the selection of experts to participate, including: knowledge and experience with the topics under investigation, ability and willingness to participate, sufficient time to participate, and effective communication skills (25); requirements that were met when selecting the population.

It should be noted that, when comparing the list reached with those proposed in the literature, it is observed that the final consolidated list includes a greater number of procedures than the international consensus, reflecting that they were described with a more analytical approach, separating in greater detail procedures that are grouped together in other lists. However, the updated American consensus (5) includes the performance of ERCP and echo-endoscopy, both present in the first round but then discarded for reaching a low level of consensus, 22% and 17%, respectively. This situation could be explained by the difficulty that exists in our country to access specific ERCP and endoscopic ultrasonography training in current postgraduate programs. With respect to the minimum number of basic endoscopic procedures, the number for upper gastrointestinal endoscopy that emerged in this study was the same as in the European consensus (200 procedures) (3), and higher than the American experience (130 procedures) (4). Colonoscopy, on the other hand, showed a lower minimum number of procedures than in Europe and the United States (200 and 140, respectively), if the most recent consensuses are considered.

Thus, we conclude that this list is fundamental in the development of a national training framework in gastrointestinal endoscopy, as well as in a competency certification program. Its advantage is that it is based on the consensus of experts representing the field of work and training in gastrointestinal endoscopy. It should be integrated into a competency-based training model that ensures not only the recording of numbers but also progress in competency development, including increasing levels of autonomy and decreasing supervision.

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Table 1: Consolidated list of procedures.
Endoscopically-guided placement of nasoenteral tube
Percutaneous endoscopic gastrostomy insertion
Intragastric balloon placement
Placement of expandable prostheses (stent)
Foreign body removal
Digestive tract dilation
Chromoendoscopy
China ink injection for marking gastrointestinal lesions
Argon plasma coagulation
BiCap Coagulation
Placement of hemostatic clip
Radiofrequency ablation
Endoscopic injection treatment for non- variceal gastrointestinal bleeding
Endoscopic gastric variceal obliteration with cyanoacrylate.
Endoscopic esophageal variceal ligation (non-bleeding)
Treatment of non-variceal bleeding lesions
Endoscopic treatment of variceal gastrointestinal hemorrhage
Endoscopic submucosal dissection
Mucosectomy of lesions < 20mm
Mucosectomy of lesions > 20mm
Colonic polypectomy < 20mm
Colonic polypectomy > 20mm
Gastric polypectomy < 20mm
Gastric polypectomy > 20mm
Post-polypectomy bleeding treatment
Echo-endoscopy
ERCP*
ERCP with papillotomy and lithiasis extraction
* ERCP: endoscopic retrograde cholangiopancreatography

Table 2: Agreement among experts based on procedure and minimum number needed for each

practice

Procedure	Agreement among experts			Agreement on the minimum number of procedures		
	Mean	SD	% of experts I* and VI**	Median	Mean and SD	Range
Endoscopically-guided placement of nasoenteral tube	3.6	0.64	94.5	10	9.9±4.46	5-20
Percutaneous endoscopic gastrostomy placement	3.5	0.68	85.37	10	11.4±4.9	5-20
Foreign body removal	3.9	0.27	97.4	15	16.9±9.18	10-50
Digestive tract dilatation	3.7	0.47	100	20	17.4±7.60	5-30
Chromoendoscopy	3.7	0.65	92.1	30	39.5±25.62	10-100
China ink injection for marking lesions	3.5	0.75	86.5	10	9.6±4.8	5-20
Argon plasma coagulation	3.5	0.65	97.2	10	14.5±7.43	5-30
BiCap Coagulation	3.1	0.7	87.5	5	6.7±2.65	5-10
Placement of hemostatic clip	3.9	0.3	100	15	15.7±7.46	5-30
Injection treatment for non-variceal gastrointestinal bleeding	3.9	0.43	97.4	15	14.4±5.79	5-20
Endoscopic esophageal variceal ligation (non-bleeding)	3.9	0.36	100	20	18.0±8.05	10-30
Treatment of non-variceal bleeding lesions	3.9	0.33	100	20	17.9±8.00	10-30
Endoscopic treatment of variceal gastrointestinal bleeding	3.8	0.46	100	20	18.8±10.5	10-40
Mucosectomy of lesions < 20mm	3.6	0.63	97.1	50	49.3±33.13	25-200
Colonic polypectomy < 20mm	3.3	0.76	100	50	52.4±29.48	25-100

Gastric polypectomy < 20mm	3.6	0.63	94.7	25	33.5±14.37	25-75
Post-polypectomy bleeding treatment	3.9	0.33	100	10	10.9±6.29	5-25

Note: The agreed procedures are grouped by percentage of experts who considered them as important (I*) and very important (VI**).

Table 3: Final list of procedures indicating the recommended minimum number

Procedure	Minimum recommended
Upper gastrointestinal endoscopy	*200*
Colonoscopy	*150*
Endoscopically-guided placement of nasoenteral tube	10
Percutaneous endoscopic gastrostomy insertion	10
Foreign body removal	15
Digestive tract dilation	20
Chromoendoscopy	30
China ink injection for marking lesions	10
Argon plasma coagulation	10
BiCap Coagulation	5
Placement of hemostatic clip	15
Injection treatment for non- variceal gastrointestinal bleeding	15
Endoscopic esophageal variceal ligation (non-bleeding)	20
Treatment of non-variceal bleeding lesions	20
Endoscopic treatment of variceal gastrointestinal bleeding	20
Mucosectomy of lesions < 20mm	50
Colonic polypectomy < 20mm	50
Gastric polypectomy < 20mm	25
Post-polypectomy bleeding treatment	10

List of abbreviations:

- SD: standard deviation
- ERCP: endoscopic retrograde cholangiopancreatography