

Original Article

COVID-19 and Canadian Gastroenterology Trainees

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Abstract

Background: The coronavirus disease 2019 (COVID-19) pandemic has impacted endoscopy services and education worldwide. This study aimed to characterize the impact of COVID-19 on gastroenterology trainees in Canada.

Methods: An analysis of Canadian respondents from the international EndoTrain survey, open from April 11 to May 2 2020 and distributed by program directors, trainees, and national and international gastroenterology societies' representatives, was completed. The survey included questions on monthly endoscopy volume, personal protective equipment availability, trainee well-being and educational resources. The primary outcome was change in procedural volume during the COVID-19 pandemic. Secondary outcomes included trainee's professional and personal concerns, anxiety and burnout.

Results: Thirty-four Canadian trainees completed the survey. Per month, participants completed a

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median of 30 esophagogastroduodenoscopies (interquartile range 16 to 50) prior to the pandemic compared to 2 (0 to 10) during the pandemic, 20 (8 to 30) compared to 2 (0 to 5) colonoscopies and 3 (1 to 10) compared to 0 (0 to 3) upper gastrointestinal bleeding procedures. There was a significant decrease in procedural volumes between the pre-COVID-19 and COVID-19 time periods for all procedures ($P < 0.001$). Thirty (88%) trainees were concerned about personal COVID-19 exposure, 32 (94%) were concerned about achieving and/or maintaining clinical competence and 24 (71%) were concerned about prolongation of training time due to the pandemic. Twenty-six (79%) respondents experienced some degree of anxiety, and 10 (31%) experienced some degree of burnout.

Conclusion: The COVID-19 pandemic has substantially impacted gastroenterology trainees in Canada. As the pandemic eases, it is important for gastrointestinal programs to adapt to maximize resident learning, maintain effective clinical care and ensure development of endoscopic competence.

Keywords: COVID-19; Education; Endoscopy

Background

The coronavirus disease 2019 (COVID-19) pandemic has had a profound impact on the provision of gastrointestinal (GI) endoscopy services worldwide (1–3). With delays to elective cases, policies to preserve personal protective equipment (PPE) and attempts to mitigate potential peri-endoscopic spread of COVID-19, there has been a considerable impact of the pandemic on gastroenterology training in Canada.

Gastroenterology trainees' professional and personal lives have changed in a number of ways. Working in healthcare during a pandemic can evoke fear and anxiety (4). Additionally, novice endoscopists must become proficient in a range of diagnostic and therapeutic procedures within a fixed time period. As the timeline for return to regular clinical activities remains unclear, many learners are concerned about achieving and maintaining clinical competence (5). Despite such drastic changes, little is known about the perspectives of GI trainees in Canada. Here, we report on Canadian data from the international EndoTrain survey.

METHODS

We conducted an analysis of Canadian respondents from the EndoTrain survey, a 37-item survey developed by an international group of endoscopy experts and educators (5). Ethical approval was provided by the Institute for Clinical and Experimental Medicine, Thomayer Hospital, Prague, Czech Republic (Reference: 9170/7.4.202; G-20-16; 8.4.2020).

The survey encompasses questions regarding background characteristics (e.g., country, year of postgraduate training), monthly endoscopy volume, PPE availability, trainee well-being and educational resources. It was distributed by program directors, trainee representatives and representatives of national and international gastroenterology societies, including the Canadian Association of Gastroenterology. The survey was open from April 11 to May 2, 2020. Further methodological details are available in the full report of the survey (5). From

the entire study population, we extracted data from fourth- and fifth-year gastroenterology trainees in Canada.

Outcomes

Our primary outcome was change in procedural volume during the COVID-19 pandemic, including esophagogastroduodenoscopy (EGD), colonoscopy and upper gastrointestinal bleeding (UGIB) management. We evaluated this for Canadian trainees by comparing their procedural volumes between two 30-day periods before and during the COVID-19 pandemic, referred to as the pre-COVID-19 time period and COVID-19 time period, respectively. As different jurisdictions experienced the pandemic in unique ways and adjusted endoscopy services at different times, the international survey did not specify a time point which was considered pre-COVID-19, and this determination was left to respondents' judgement.

We also included the following secondary outcomes:

- Trainees' concerns about personal safety, clinical competence and prolongation of training due to the pandemic.
- Anxiety, as measured by the Generalized Anxiety Disorder (GAD-7) scale (6).
- Burnout, as measured using a single-question scale (7).

Analysis

We presented all continuous variables as medians with interquartile range (IQR) and categorical variables with counts and frequencies. For the primary outcome, we compared procedural volumes during the pre-COVID-19 and COVID-19 time periods using Wilcoxon signed-rank tests. We also compared percentage reductions in procedural volumes between procedures using the Kruskal–Wallis test and follow-up Dunn's test for pairwise comparisons if necessary. For secondary outcomes, we calculated descriptive statistics only. All analyses were performed using SPSS version 26.0 (IBM®, Armonk, NY, United States).

RESULTS

Thirty-four Canadian trainees completed the survey. With approximately 87 fourth- and fifth-year gastroenterology trainees in Canada, based on the 2018 to 2019 Canadian Postgraduate MD Education Registry Specialty Report (8), the response rate was 39%. Background characteristics are summarized in Table 1.

Procedural Volume

Participants performed a median of 30 EGDs (IQR 16 to 50), 20 (8 to 30) colonoscopies and 3 (1 to 10) UGIB procedures per month prior to the COVID-19 pandemic. During the pandemic, participants performed a median of 2 (0 to 10) EGDs, 2 (0 to 5) colonoscopies and 0 (0 to 3) UGIB procedures per month. Across all three procedures, Wilcoxon signed-rank tests showed that there was a significant decrease in procedural volumes between the pre-COVID-19 and COVID-19 time periods ($P < 0.001$) (Figure 1).

At the level of individual participants, all (100%) reported a decrease in their monthly EGD and colonoscopy volumes during the pandemic, and 24 (71%) participants had a reduction in their UGIB management volume. The median percentage decrease in procedural volume was 92% (73% to 100%) for EGD, 92% (75% to 100%) for colonoscopy and 65% (0% to 100%) for UGIB management (Figure 2). A Kruskal–Wallis test showed no significant difference between procedures for percentage decrease in case volume.

With respect to reasons for decreased case volume, 21 (62%) participants cited institutional policy, 20 (59%) cited a lack of cases, 16 (47%) cited a lack of adequate PPE, 2 (6%) cited redeployment to other services and 1 (3%) cited personal reasons as barriers.

Personal Protective Equipment

Twenty-six (76%) respondents received training on the use of PPE for patients with COVID-19 and 15 (44%) received training on how to manage a patient with COVID-19 in the endoscopy suite. Twenty-five (74%) respondents had adequate

access to PPE, though 22 (65%) reported that their institution restricted endoscopy volume in part because of a lack of PPE. With respect to guidelines on PPE, trainees reported that their institutions most commonly followed local hospital-based guidelines ($n = 14$ [41%]), national ($n = 11$ [32%]) or international guidelines ($n = 4$ [12%]).

Concern About COVID-19, Endoscopy Training, Anxiety and Burnout

Thirty (88%) trainees were concerned about personal COVID-19 exposure, 32 (94%) were concerned about achieving and/or maintaining clinical competence and 24 (71%) were concerned about prolongation of training time due to the pandemic. Levels of concern varied among trainees and are detailed in Figure 3.

When asked about levels of anxiety and burnout, 33 participants responded (Figure 4). Based on the GAD-7 scale, 7 (21%) experienced no anxiety, 15 (46%) experienced mild anxiety, 4 (12%) experienced moderate anxiety and 7 (21%) experienced severe anxiety. Based on the single-question burnout scale, 5 (16%) reported enjoying work and having no signs of burnout, 17 (53%) reported occasionally feeling under stress but not burnt out, 1 (3%) reported having feelings of burnout that would not go away and feeling frustration at work often and 9 (28%) reported burning out and suffering from mental and physical exhaustion.

Educational Resources

Trainees used a variety of educational resources to supplement their clinical training during the pandemic (Table 2). Twelve (35%) trainees attended in-person teaching organized by their institution that continued throughout the pandemic. With respect to online resources, 18 (53%) trainees accessed online teaching delivered by their institution, 18 (53%) used educational materials from gastroenterology specialty societies (e.g., CAG, ASGE), 17 (50%) read endoscopy journals and 9 (26%) attended webinars. Thirteen (38%) respondents used social media to supplement their learning, 11 (32%) of whom used it daily.

Discussion

The results of this study highlight the significant impact that the COVID-19 pandemic has had on endoscopy training across Canada. Our findings must be interpreted in the broader context of the pandemic (5). Given system-wide efforts to limit the spread of COVID-19, a reduction on endoscopic procedure numbers is expected (9). Canadian gastroenterology programs already monitor trainee procedure numbers, and can use existing infrastructure to determine if the case reduction is substantial enough to compromise trainees' clinical competence, or to require prolongation in training to gain adequate endoscopic exposure. We propose that training programs should

Table 1. Background characteristics of respondents

Characteristic	Canadian respondents, $N = 34$
Age	
Median (IQR)	31 (29–32)
Gender	
Female, n (%)	14 (41%)
Program, n (%)	
Adult gastroenterology	24 (71%)
Pediatric gastroenterology	10 (29%)
Year of gastroenterology training, n (%)	
First year	20 (59%)
Second year	14 (41%)

IQR, Interquartile range.

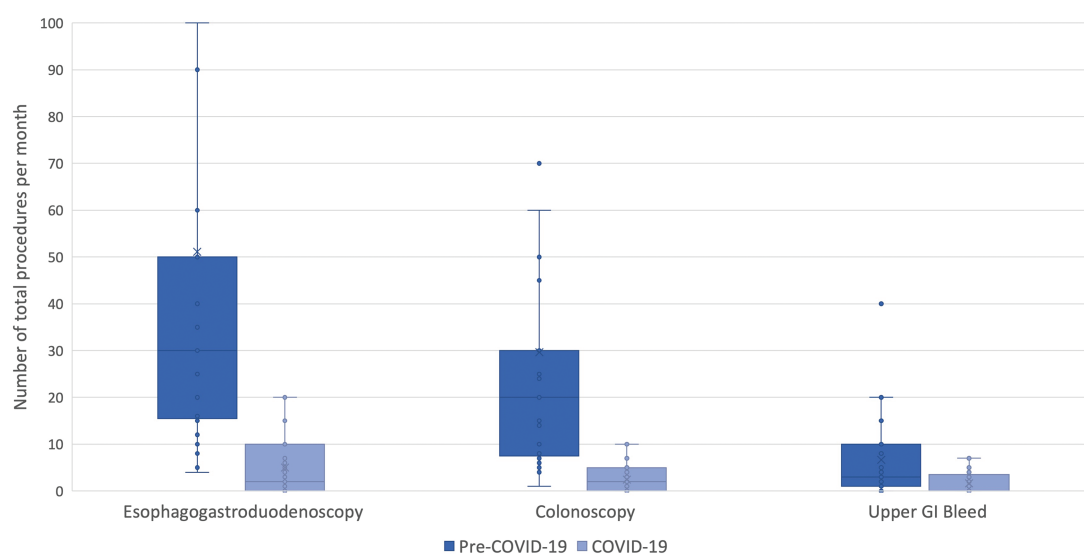


Figure 1. Self-reported case volume prior and during coronavirus disease 2019 pandemic. The median is represented by the dark horizontal bar which intersects each of the three vertical bars. The 25th and 75th percentiles are represented by the bottom and top ends of the vertical bar, respectively. The error bars represent the lowest and highest number of monthly procedures reported.

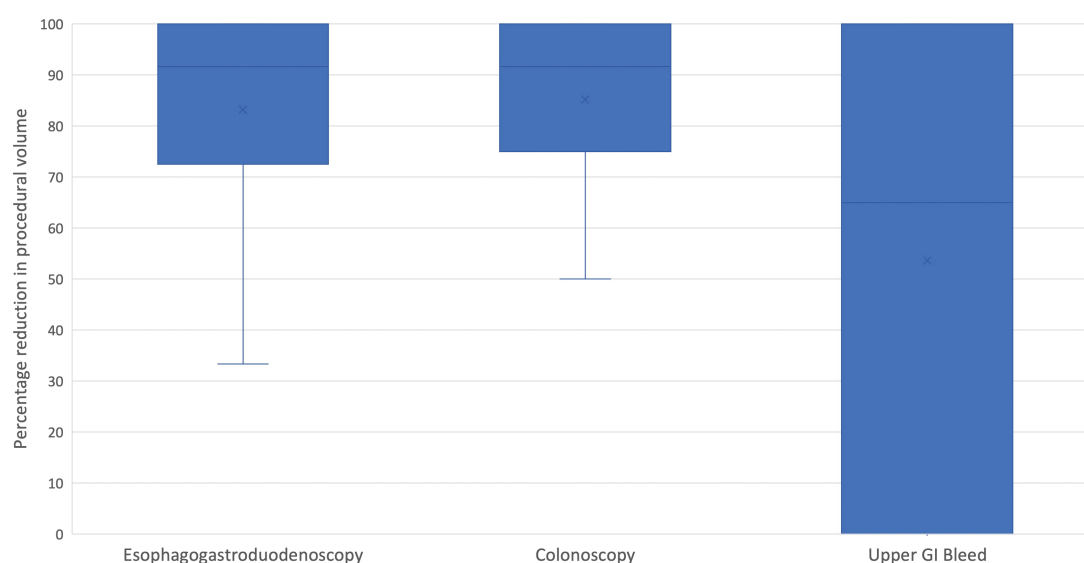


Figure 2. Self-reported reduction in esophagogastroduodenoscopy, colonoscopy and upper gastrointestinal bleeding case volume. The median is represented by the dark horizontal bar which intersects each of the three vertical bars. The 25th and 75th percentiles are represented by the bottom and top ends of the vertical bar respectively. The bottom error bar represents the smallest percentage change in procedural volume reported.

openly recognize that minimum procedural numbers may be inferior metrics to ascertaining performance when compared to validated instruments of competence (10,11). As endoscopy services re-open and more trainees return to the suite, programs should use assessment tools with strong evidence of validity (10,12,13) to formally characterize their trainees' competence, highlight deficiencies and inform individualized learning plans to tailor residents' training experiences.

It is important to recognize the potential ongoing impact of COVID-19 and the pressure to manage the backlog of postponed endoscopic procedures. Programs will need to

consider alternative ways to maintain resident training while balancing clinical demands, including use of faculty coaches to help detect impending or active problems and focus residents learning activities, and rotations at community sites to avoid resident crowding (14). Additionally, validated training interventions that do not require direct patient care should be used to supplement hands-on experience. Simulation-based training for novices, for example, has been shown to lead to improved endoscopic technical and non-technical skills (15–17); it also shortens the time required to attainment competence (18). Furthermore, benchmark videos and computerized

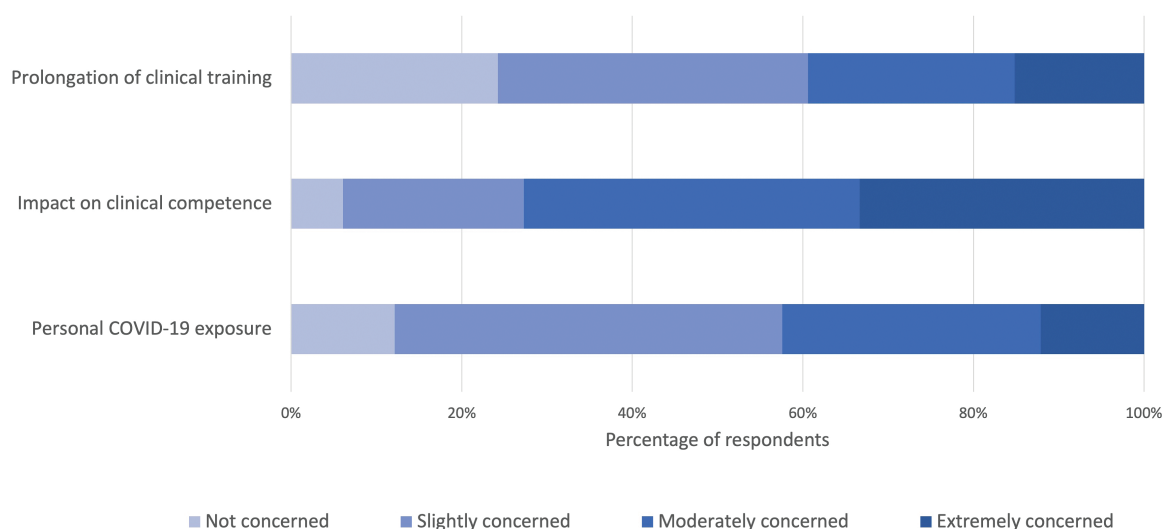


Figure 3. Level of concern about coronavirus disease 2019 and personal risk of exposure, clinical competence and potential prolongation of training.

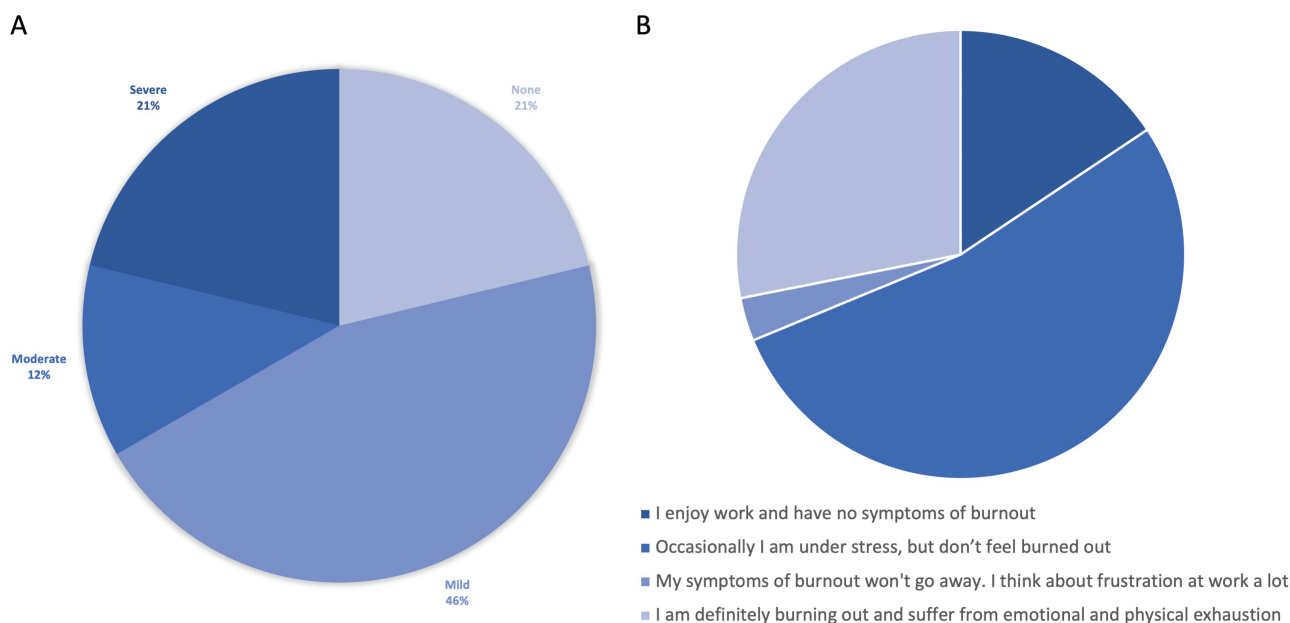


Figure 4. (A) Severity of self-reported anxiety symptoms, based on the Generalized Anxiety Disorder-7 scale (6); (B) rates of burnout, based on a single-item burnout scale (7).

feedback can be used to help improve trainees' self-assessment abilities, enabling them to better self-direct their own learning, selecting learning tasks that fit their learning needs (19,20). Incorporating these evidence-based strategies into a national simulation curricula can allow programs to supplement traditional patient-based training during the pandemic.

Cognitive skill development in endoscopy can be supplemented by online education from curated resources and social media, areas that have shown encouraging growth during the pandemic (21). Many institutions and GI professional societies provide high-quality online education, including CAG which has numerous web-based modules on a variety of topic areas on its ePortal (22). Additionally, there

has been a wave of new open-access resources on social media. On Twitter, structured conversations on various topics occur weekly through platforms such as @ScopingSundays, an endoscopy focused account, @GIJournal, a virtual interactive journal club, and @MondayNightIBD, focused on inflammatory bowel disease (23–25). We found, however, that less than half of our respondents used didactic curricula, social media and webinars and that less than 60% used distance learning, subspecialty courses and endoscopy journals. Low uptake of these resources highlights an opportunity for programs and GI societies to improve trainee engagement, as participating in these continuing education activities may help trainees maintain their competence.

Table 2. Endoscopy-related educational resources used by respondents during the coronavirus disease 2019 pandemic

Resource	Description	Number of respondents *			
		Not used	Monthly	Weekly	Daily
Didactic curriculum	In-person teaching organized by the institution or program	21 (64%)	0 (0%)	9 (27%)	3 (9%)
Distance learning	Online teaching organized by the institution or program	15 (46%)	1 (3%)	14 (42%)	3 (9%)
Gastroenterology society courses	Online teaching organized by a professional GI organization (e.g., CAG, ASGE, AGA)	15 (46%)	3 (9%)	12 (36%)	3 (9%)
Social media	Websites or applications that allow trainees to create and share content or to participate in social networking, such as Twitter, Facebook or Instagram	20 (61%)	0 (0%)	2 (6%)	11 (33%)
Endoscopy journals	Academic journals dedicated to clinical gastroenterology and endoscopy	16 (49%)	5 (15%)	8 (24%)	4 (12%)
Webinars	Online event with expert-delivered material on a given topic	24 (73%)	1 (3%)	3 (9%)	5 (15%)

AGA, American Gastroenterological Association; ASGE, American Society for Gastrointestinal Endoscopy; CAG, Canadian Association of Gastroenterology.

*One respondent did not answer this question.

With respect to anxiety and burnout, the pandemic has affected the mental health of healthcare workers across the spectrum (26–28). In our study, the majority of gastroenterology trainees reported some degree of anxiety and 31% reported some degree of burnout. However, whether anxiety and burnout have increased during the pandemic is unclear. Many trainees may experience anxiety and burnout during the course of subspecialty training, and we do not have pre-pandemic data related to these factors. There are also scant data published on the well-being gastroenterologists in general (29). Fortunately, postgraduate gastroenterology programs in Canada, provincial resident unions and the Canadian Medical Association have all offered numerous mental health resources, including online wellness sessions, educational tools and hotlines (30,31).

This study has several important limitations. First, information on trainees' provincial location was not collected and regional differences in COVID-19 case numbers and government policies may have impacted endoscopy service delivery and trainee involvement differentially. This is especially important when considering that, if there were more respondents from provinces with more COVID-19 cases, our data may overestimate the impact of the pandemic on GI trainees in regions with fewer respondents. Second, our survey provides data from a single point in time and is not reflective of the dynamic nature of institutional policy during a pandemic. For example, respondents likely gained more reliable access to PPE and participated in more cases as the pandemic went on. Third, we did not account for residents potentially being on clinical rotations that offer less endoscopy exposure, such as hepatology or nutrition. Finally, our findings must be interpreted within

the inherent limitations of survey-based data, including reporting bias, non-response bias, sampling error and recall bias, as our procedural volume numbers were based on trainees' estimations (32).

Despite these limitations, these data provide valuable insight into the impact of the COVID-19 pandemic on gastroenterology trainees in Canada. As the pandemic eases, it is important for GI programs to adapt to maximize resident learning, maintain effective clinical care and ensure development of endoscopic competence.

Conflicts of Interest: RK has received research grants from AbbVie and Ferring Pharmaceuticals and research funding from Pendopharm. SCG has received research grants and personal fees from AbbVie and Ferring Pharmaceuticals, personal fees from Takeda, education grants from Janssen and has equity in Volo Healthcare. All other authors have no relevant disclosures.

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