Impact of COVID-19 Pandemic on Gastroenterology Fellowship Training in Turkey: A Prospective Nationwide Survey Study

Q1 Coşkun Özer Demirtaş[1,2], Cavansir Vahabov[2], Fuad Mustafayev[2], Tevhide Sahin[2], Erkan Parlak[2]

[1]Department of Gastroenteroloy, School of Medicine, Marmara University, Istanbul, Turkey
[2]Department of Gastroenterology, School of Medicine, Hacettepe University, Ankara, Turkey

Cite this article as: Özer Demirtaş C, Vahabov C, Mustafayev F, Sahin T, Parlak E. Impact of COVID-19 pandemic on gastroenterology fellowship training in Turkey: A prospective nationwide survey study. *Turk J Gastroenterol.* 2021; 32(10): 879-887.

ABSTRACT

Background: *The Coronavirus-2019 disease (COVID-19) pandemic has markedly restricted endoscopic and clinical activities in gastroenterology (GI), with a negative impact on trainee education. We aimed to investigate how and to what extent has GI trainees in Turkey are affected by the current pandemic in terms of general, psychological, and educational status.*

Methods: *We conducted a web-based survey sent electronically to 103 official GI trainees in Turkey from 37 centers. The 32-item survey included questions to capture demographic (5-questions), endoscopic (7-questions), personal protective equipment (PPE) (3-questions), psychological and general well-being (11-questions), and educational (6-questions) data.*

Results: *Ninety-six (93.2%) trainees completed the survey, of which 56.3% (n = 54) reported a decrease in independently performed endoscopic procedures. Due to pandemic, 91.7% of standard diagnostic endoscopic procedures, 57.2% of standard therapeutic procedures, and 67.7% of advanced endoscopic procedures were decreased. Out of 96 respondents, we detected signs of anxiety in 88.5%, exposure concern in 92.7%, concerns for prolongation of training period in 49%, loss of concentration and interest in 47.9%, and burnout syndrome in 63.5%. Female gender (odds-ratio: 3.856, 95% confidence interval: 1.221-12.174, P = .021) was the only independently associated factor with pandemic-related anxiety.*

Conclusions: *COVID-19 pandemic has led to high amounts of anxiety and non-negligible rates of burnout syndrome among GI trainees, with a significant reduction in endoscopic activities. More effort and novel strategies are required to deliver sufficient competence and general-psychological well-being to GI trainees.*

Keywords: *Coronavirus-2019 disease, gastroenterology, fellowship, anxiety, burnout*

INTRODUCTION

The coronavirus disease-2019 (COVID-19), caused by severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) infection, has been responsible for a large number of hospital admissions and mortality since the beginning of the pandemic in December 2019.[1] The emergence of COVID-19 disease has rapidly disrupted the routine practice of medicine and resulted in health care system restrictions with additional requirements to healthcare workers and personal protective equipment (PPE). Moreover, the COVID-19 pandemic led to compulsorily reorganizations in the healthcare systems to cope with the crisis. In many centers, internal medicine, anesthesiology, and intensive care physicians stepped into the frontline to manage COVID-19 patients, whereas interventional procedures were limited to only essential or urgent procedures.[2] COVID-19 pandemic has tremendously impacted the clinical, educational, research, and community responsibilities in many academic programs as well.

Gastroenterology (GI) fellowship is one of the training programs where trainees have a high risk of exposure due to the performance of aerosolizing procedures.[3] Given the significant volume of elective procedures in endoscopy units, the activity of GI was dramatically decreased during the COVID-19 pandemic in line with the rigorous recommendations of multiple GI societies to curb exposure and prevent PPEs.[4-6] The reduction of endoscopic procedures was reported to be over 75% in the first 3 months of the pandemic.[7,8] All these mentioned factors and the unpredictable course of the pandemic are likely to increase psychological distress among GI trainees. Even before the COVID-19 pandemic, a robust body of work has demonstrated that trainees from different specialties face anxiety, burnout, and depression during

Corresponding author: **Coşkun Özer Demirtaş**, *e-mail:* **coskun_demirtas10@hotmail.com**
Received: **December 12, 2020** *Accepted:* **February 22, 2021** *Available Online Date:* **November 1, 2021**

DOI: 10.5152/tjg.2021.201110

their training period.[9-12] Consequently, the potential for a decline in their well-being due to the COVID-19 pandemic is highly plausible. Similar issues have recently been evaluated in an international survey among endoscopy trainees including several participants from internal medicine, adult and pediatric GE, and general surgery units.[13]

In the present article, we aimed to determine the impact of the COVID-19 pandemic on GI trainees in Turkey with regard to alteration of endoscopic activities, and the psychological-general well-being of trainees. Besides, we aimed to expose the potential factors affecting the psychological condition of GI trainees, and the educational efforts among trainees to preclude vocational incompetency owing to the reduced activities.

METHODS

Sample Selection and Study Design

All official GI trainees under an active training program in Turkey during the COVID-19 pandemic (n = 103) were invited to complete the survey in October 2020. Those under Non-GI endoscopy training programs, pediatric GI trainees, or surgical residents were not included in the study. An invitation was sent to GI trainees from 7 regions, 23 cities, and 37 academic centers in Turkey via group instant messaging (WhatsApp) bearing the web link for guidance to start the survey. The purpose of the study was explained to the participants at the time of enrollment. Responding to the survey questions was considered consent to participate. The authors were allowed to participate in the survey only once. A second reminder was sent individually via the same route after 3 days, and the survey was completed in 1-week. At the end of the collecting period, 96 out of 103 respondents completed the questionnaire. Submission of partially completed questionnaires was not acknowledged. The survey response rate was 93.2%.

Survey Structure and Outcomes

A 32 item questionnaire was designed using SurveyMonkey® by one of the authors, and then evaluated for face, content, and construct validity with a pretesting period by 5 GE trainees and 2 consultants. The questions were designed along with 5 thematic categories to capture demographic (5-questions), endoscopy-related (7-questions), PPE (3-questions), and psychological and general well-being (11-questions), and education-related (6-questions) data. The survey consisted of combined yes-no and multiple-choice format questions with predefined answers offering respondents the possibility to choose and rank among several options or the possibility to grade from a "None" or "mild" to "moderate" or "high." A few questions had the provision of choosing multiple options. The questions included in the survey are presented in Supplementary Table 1.

Outcomes and Definitions

The primary outcome of the study was the degree of reduction in the volume of endoscopic procedures and attendance of GI trainees, on a total and per-procedure basis. Secondary outcomes were anxiety and burnout. Loss of concentration and interest, the reduction in the success of endoscopic procedures, concerns for COVID-19 exposure, and prolonging of training period were also evaluated.

Standard diagnostic procedure term was used to define routine elective diagnostic upper GI and lower GI endoscopic procedures, whereas standard therapeutic procedure was attributed to the management of upper or lower GI bleeding to assess hemostasis (injection sclerotherapy, variceal banding, argon plasma coagulation, etc.), polypectomy and foreign body removal. These definitions were used to categorize the procedures which are required to be performed by trainees independently during the GI fellowship period in Turkey. Endoscopic retrograde cholangiopancreaticography (ERCP), endoscopic ultrasound (EUS), endoscopic mucosal resection (EMR), endoscopic surgical dissection (ESD), GI stenting (esophageal-duodenal-colonic), GI dilatation, botox injection, and

MAIN POINTS

- *A nationwide web-based survey was conducted on 96 (93.2% of all official gastroenterology (GI) trainees in Turkey) GI trainees in Turkey from 37 centers, to assess their general, educational, and psychological status during the Coronavirus-2019 disease (COVID-19) pandemic.*
- *Independently performed endoscopic procedure volume has decreased dramatically among Turkish GI trainees in line with the rigorous recommendations of multiple GI societies to curb exposure and prevent personal protective equipment (PPE).*
- *The majority of GI trainees in Turkey (88.5%) suffer from anxiety, and a significant proportion shows signs of pandemic-associated burnout syndrome (63.5%), loss of concentration and interest in the gastroenterology field (47.9%), and concerns for prolongation of the training period (49%).*
- *Rational interventions with more attractive virtual meetings and hands-on training strategies are required to preclude incompetency among GI trainees during the pandemic.*

third-space endoscopies (peroral myotomy, etc.) were categorized as advanced endoscopic procedures.

Statistical Analysis

All continuous variables were assessed for normality distribution using Shapiro–Wilk and Kolmogorov–Smirnov test, and reported as the median and interquartile range (IQR) or mean ± standard deviation (SD) when appropriate. Categorical variables were given as frequency and percentage. For the comparison of continuous variables; an independent sample student's *t*-test was used when the data conformed to a normal distribution; otherwise, Mann–Whitney *U*-test was used. The Chi-square test was used to compare categorical parameters. Logistic regression analysis was performed to assess the factors associated with outcomes among GE trainees. The statistical significance was defined as $P < .05$. All statistical analyses were conducted using the SPSS software version 20.0 (IBM, Armonk, NY, USA).

RESULTS

Demographics and Pandemic Related Characteristics

Demographic and COVID-19 pandemic-related general characteristics are demonstrated in Table 1. The median age of respondents was 34 (29-47). The majority of the GI trainees were male (81.3%, n = 78) and married (80.2%, n = 77). The respondents were distributed in all regions of Turkey including 23 cities and 37 academic centers (Supplementary Figure 1). Forty participants (n = 41.7%) were in their first year of training, whereas the remaining 25 (26.0%) and 31 (32.3%) were in the second and third year of their fellowship program, respectively. Sixty-seven (69.8%) participants received education from their institution for the usage of PPE either via face-to-face or virtual concept. Approximately only a quarter of respondents (27.1%, n = 26) estimated that their institution had sufficient PPE stocks. Seventy-one (69.8%) respondents were tested for COVID-19, and 20 (20.8%) were quarantined due to suspicion of COVID-19 in him/herself or a family member. Three (3.1%) respondents had COVID-19 disease documented by polymerasechain reaction (PCR) test.

Table 1. Demographic and COVID-19 Pandemic-related General Characteristics

	GI Trainees (n = 96)
Age, years	34 (29-47)
Gender,	
Male	78 (81.3)
Female	18 (18.8)
Marital status	
Single	18 (18.8)
Married (no kids)	12 (12.5)
Married (with kids)	65 (67.7)
Divorced	1 (1.0)
Year of training	
0-1	40 (41.7)
1-2	25 (26.0)
2-3	31 (32.3)
PPE education	67 (69.8)
PPE adequacy	26 (27.1)
Quarantined due to COVID-19 suspicion	20 (20.8)
COVID-19 tested	
No	29 (30.2)
Yes (suspicion of disease)	39 (40.6)
Yes (prophylactic)	19 (19.8)
Yes (institute policy)	9 (9.4)
COVID-19 positivity	3 (3.1)

COVID-19, Coronavirus-2019 disease; GI, Gastroenterology; PPE, Protective personal equipment.

Changes in Endoscopic Procedure During Pandemic

Endoscopy-related characteristics and changes in the era of the COVID-19 pandemic are presented in Table 2. In comparison with the pre-pandemic period, there was a decline in 91.7% of standard diagnostic endoscopic procedures, 57.2% of standard therapeutic procedures, and 67.7% of advanced endoscopic procedures. Out of 96 respondents, 54 (56.2%) reported a decrease in independently performed procedures, but 14 (14.6%) declared an increase instead. The variety of procedural attendance among the trainees was also decreased in 22 (22.9%) respondents, but increased conversely in 16 (16.7%) respondents. The rate of independently performed procedures and variety of procedural attendance among trainees remained stable in 28 (29.2%) and 58 (60.4%), respondents respectively. The accessibility of GI trainees to their consultants or mentors in endoscopy units was decreased in 44 (45.8%) and remained the same in 51 (53.1%) respondents during the pandemic.

COVID-19 Pandemic Related General, Psychological, and Functional Outcomes in Gastroenterology Trainees

The impact of the COVID-19 pandemic on the general, psychological and functional outcomes of GI trainees are

Table 2. Endoscopy-Related Characteristics and Changes in the Era of COVID-19 Pandemic

	GI Trainees (n = 96)	
Attended procedure types*	Before Pandemic	Pandemic Era
Upper GI endoscopy	96 (100.0)	96 (100.0)
Lower GI endoscopy	84 (87.5)	89 (92.7)
Endoscopic retrograde cholangiopancreaticography	59 (61.5)	68 (70.8)
Endoscopic ultrasound	43 (44.8)	45 (46.9)
Endoscopic mucosal resection	21 (21.9)	21 (21.9)
Endoscopic submucosal dissection	12 (12.5)	10 (10.4)
Esophageal stent	55 (57.3)	51 (53.1)
Duodenal stent	24 (25.0)	22 (22.9)
Colonic stent	18 (18.8)	16 (16.7)
GI dilatation	56 (58.3)	58 (60.4)
Botox injection	12 (12.5)	10 (10.4)
Third space endoscopies (Peroral myotomy, etc.)	3 (3.1)	3 (3.1)
Number of independently performed procedures	Before Pandemic	Pandemic Era
1-10	15 (15.6)	60 (62.5)
11-20	38 (39.6)	17 (17.7)
21-30	20 (20.8)	2 (2.1)
>30	2 (2.1)	1 (1.0)
Not started yet	21 (21.9)	10 (10.4)
Stopped performing	-	6 (6.3)
Changes in volume of routine endoscopic procedures;	Diagnostic	Therapeutic
Not changed	8 (8.3)	41 (42.7)
1-25% decrease	24 (25.0)	26 (27.1)
26-50% decrease	43 (44.8)	24 (25.0)
51-75% decrease	18 (18.8)	3 (3.1)
76-100% decrease	3 (3.1)	2 (2.1)
Changes in volume of advanced endoscopic procedures;		
Not changed	31 (32.3)	
1-25% decrease	26 (27.1)	
26-50% decrease	27 (28.1)	
51-75% decrease	7 (7.3)	
76-100% decrease	5 (5.2)	

*The attendance is either as an independent performer or with the consultant/mentor.
COVID-19, Coronavirus-2019 disease.

presented in Figure 1. In total, 88.5% (n = 85) reported pandemic-related general anxiety and exposure to SARS-CoV-2 infection. Eighty-three respondents (85.5%) noticed a reduction in work performance and 47 (49%) had concerns for prolongation of the fellowship period. Forty-six participants (47.9%) reported a loss of concentration and interest in the GI field during the pandemic, and 61 (63.5%) had significant pandemic-related burnout syndrome.

Multivariate Logistic Regression Analysis for Anxiety and Burnout Syndrome

Univariate analysis revealed that female gender (P = .015), being quarantined due to COVID-19 exposure (P = .04) and decline in research activities (P = .025) were associated with pandemic-related anxiety. As a result of multivariate analysis, female gender was found as the only independently associated factor with pandemic-related anxiety (odds-ratio: 3.856, 95% CI: 1.221-12.174, P = .021). Results of logistic regression analysis for pandemic-related anxiety are demonstrated in Table 3. Performing the same analysis, we found no significant factor to be associated with pandemic-related burnout syndrome (Supplementary Table 2).

Educational Efforts to Cover Incompetency

Guidelines published to aspect endoscopic and clinical activities during the COVID-19 pandemic were found sufficient by 52 (54.2%) GI trainees. Forty-seven (49.0) reported the loss of will in reading activities within the GI field, and 40 (41.7%) declared the loss of will in research activities. The majority of the GI trainees benefited from national virtual meetings (63.5%, n = 61), followed by articles from medical journals (58.3%, n = 56) and webinars of the Turkish Society of Gastroenterology (TSG) (50%, n = 48). In lesser amounts, GI trainees followed social media (34.3%, n = 33), international virtual meetings (28.1%, n = 27), institutional virtual (25%, n = 24), and face-to-face (15.6%, n = 15) meetings to preclude vocational incompetency due to COVID-19 pandemic (Figure 2).

DISCUSSION

The present article has shed light on the general well-being, psychological, and educational status of GI trainees in the era of the COVID-19 pandemic. The COVID-19 pandemic resulted in reduced training time for current GI trainees in Turkey, due to a severe drop in the volume of endoscopic procedures. The major proportion of postponed procedures have consisted of elective diagnostic

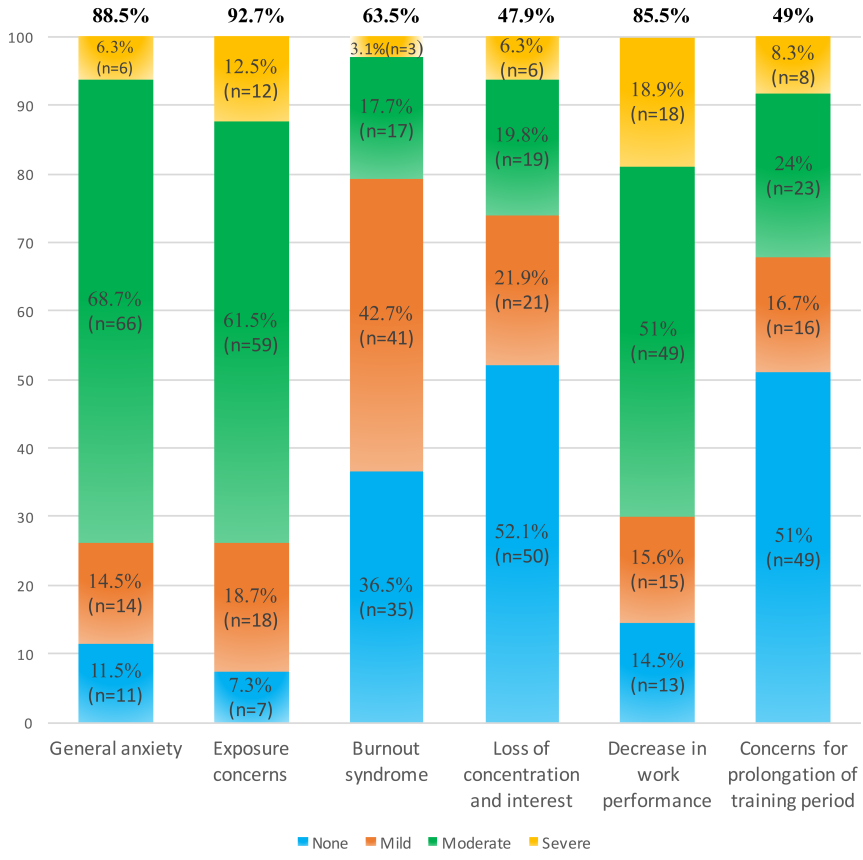


Figure 1. Impact of COVID-19 pandemic on general, psychological, and functional outcomes of gastroenterology trainees.

procedures. As a reflection, 56.2% declared a reduction in an independently performed endoscopic procedure. Despite this decrease, trainee attendance to different procedures did not change prominently. There was a significant increase in attendance to ERCP (≈10% increase), which was probably a reflection of more free time of GI trainees to join more advanced procedures rather than standard endoscopic procedures. However, the procedural volume is a measurable metric and might be conversely correlated with the development of necessary manual skills, although not a perfect surrogate for competence. In this regard, one can say that these mandatory changes might cause inevitable consequences not only for GI trainees but also for those in other specialties requiring interventional skills. However, it should be noted that our findings are in line with the international reflex to decrease endoscopic activities throughout the world, and the reduction rates are proximate.[14-16] The index study by Kawlak PM et al., an international survey study conducted by the attendance of 770 trainees from 63 countries, reported a reduced rate of 93.8% in their monthly endoscopy case volume attributable to COVID-19.[13] In 2 other recent surveys studies from Italy and United Kingdom showed that the rate of reduction in monthly endoscopic procedures due to COVID-19 pandemic was reported as 91% and 93.5-96%, respectively.[17,18]

The present study was conducted in the seventh month (October 2020) of the pandemic in Turkey, which was just before the beginning of the second wave. Therefore, the results of the present study represent the status of GI trainees in the first wave (March to September 2020) of the COVID-19 pandemic in Turkey. Although the incidence of COVID-19 varied within this time period, the participants were asked to respond to all questions considering this 6-month period overall, to prevent different interpretations by trainees and lead to heterogeneity in responses in terms of beginning and the end of the first wave. Our survey showed that there is still a substantial proportion of GI trainees who did not receive education for correct usage of PPE (≈30%), and the majority (≈70) believe that PPE stocks are not adequate in their center. These findings raise concerns about the lack of a standard nationwide policy for the utilization

Table 3. Multivariate Logistic Regression Analysis for Pandemic-related Anxiety in Gastroenterology Trainees

	Univariate Analysis	Multivariate Analysis		
	P	Odds ratio	95% CI	*P*
Age, years	.389			
Female gender	**.015***	3.856	1.221-12.174	**.021****
Being married	.594			
Having children	.992			
Years of training *(0-1 vs. 1-2 vs. 2-3)*	.257			
Decrease in variety of procedures	.661			
Decrease in independently performed procedures	.130			
Decrease in standard diagnostic procedures	.116			
Decrease in standard therapeutic procedures	.488			
Decrease in advanced endoscopic procedures	.517			
Getting education for PPE usage	.105			
PPE adequacy	.093			
Stayed away from work due to COVID-19	**.040***	2.102	0.703-6.288	.184
Decrease in work performance	**.066***	2.079	0.775-5.576	.146
Concerns for prolongation of training period	**.066***	1.718	0.642	4.603
Tested for COVID-19 disease	.165			
Experiencing suspicion of COVID-19 disease	.196			
Being infected with COVID-19	.305			
Getting psychological support	.898			
Guideline adequacy	.292			
Decrease in academic/work-related reading	.563			
Decrease in research activities	**.025***	0.497	0.188-1.313	.158
Decrease in reachability to a consultant	.563			

COVID-19, Coronavirus-2019 disease; CI, Confidence interval; PPE, Personal protective equipment.

and providence of PPEs. The rates of anxiety and burnout syndrome were 88.5% and 63.5% in our study, which was way higher than the rates of any-level anxiety or burnout from a recent international survey with the attendance of 770 endoscopy trainees from different specialisms.[13] The authors reported anxiety in 52.4% and burnout in 18.8% of respondents. In the same study, 71.9% of the trainees reported concerns for prolongation of the training period, whereas it was only 32.3% in our study. The higher anxiety and burnout rates in our cohort might have reflected lack of will to extend the training period. Moreover, female gender was the only independently associated factor with COVID-19 pandemic-related anxiety in our study, consistent with data from the pre-pandemic era revealing a general association of female gender with anxiety.[19]

The high rates of emotional stress among physicians often lead to inferior patient outcomes, the decline in the success of decision-making progress, and increases the risk for mistakes such as failing to comply with safety measures, especially inappropriate utilization of PPEs.[20,21] Nevertheless, it should be noted that the COVID-19 related anxiety and emotional vulnerability detected in GI trainees in our study was not so different in the general population and healthcare workers.[22] Furthermore, emotional stress and burnout is not an uncommon issue among gastroenterologists, especially for trainees in the pre-pandemic period as well.[23,24] Thus, strategies to minimize the psychological stress of COVID-19 on healthcare workers including increased educational activities and digital psychological support meetings can be considered as

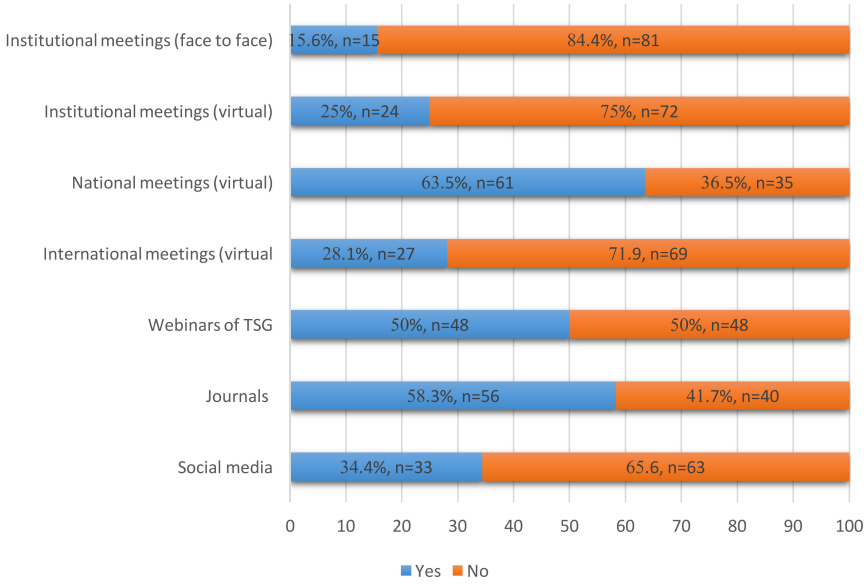


Figure 2. Educational efforts among gastroenterology trainees to preclude incompetency during the COVID-19 pandemic.

utilizable contributions to reduce the anxiety and vulnerability of GI trainees.[25] Although the exact influence of the COVID-19 pandemic on GI trainees cannot be determined until long after the pandemic has ended, the findings from this survey highlight the proximal changes that are currently faced.

The GI fellowship in Turkey, as a specialty with a required 3-year training period, during which trainees are expected to achieve the necessary technical skills for independent endoscopic practice, as well as patient management in outpatient and inpatient clinics. As a procedural specialty, minimal procedural volumes are generally required for GI trainees to ensure the development of appropriate endoscopic technical skills. Considering the shift of clinical activities from specialties toward COVID-19 care-related activities, the GI trainees are falling behind in clinical education as well. The educational aspects in GI are limited in terms of traditional teaching modalities including faculty-led didactic education, bedside teaching, and procedural teaching due to decreased volume in endoscopic procedures. There is no doubt that education has to find itself new ways. In this regard, these challenges have spawned unique opportunities to expand the scope of the training in terms of virtual conferences and telemedicine activities.[26] According to respondents in the current survey, the most beneficial item for educational sense was virtual national meetings, while only 28% of GI trainees in Turkey followed international virtual meetings. These findings point to the need for further familiarization of virtual conferences and meetings among Turkish GI trainees. In our opinion, the trainees may be given the freedom to decide on a lengthening on their training period, but it should not be set as a mandatory rule. We believe that they will be able to catch up in terms of competency, and this approach would have a positive impact on their anxiety levels. Besides, periodic virtual meetings within 1 or 2-week period seem to be the new normal of GI training and should be considered compulsorily. Centers can encourage and support financially their trainees for access to endoscopic video libraries.

There are several limitations of the present study. First, this was a nationwide cross-sectional study that was conducted on GI trainees in Turkey only. Thus, the results may not be generalized to other nations. Secondly, surveys are always open to misinterpretations by respondents. Therefore, we tried to be explanatory as possible for each question and set "other" option for those with multiple choice. As with most of the surveys, the findings of the present survey are cross-sectional, so recall bias can also be present. Finally, the present 32-item questionnaire is not validated, but it was constructed after a comprehensive review of existing literature of surveys performed on various trainees and residents, investigating similar outcomes. Besides, this study can be considered as a snapshot of the current status of GI trainees in Turkey which has never been investigated before.

In summary, a high prevalence of pandemic-related anxiety including concerns of exposure to COVID-19, prolongation of the training period, and reduction in endoscopic performance success is detected among Turkish GI trainees. Many are losing concentration and interest in the GI field, due to the uncertain course of the pandemic. A non-negligible proportion of GI trainees suffer from burnout syndrome. The present findings are documentation of what many of us have known intuitively for a long time and the highlight of the adverse impacts of the COVID-19 pandemic on GI fellowship. More effort and novel strategies are required to alleviate emotional stress and deliver sufficient competence to GI trainees, including periodic virtual meetings within 1 or 2 weeks, access to endoscopic video libraries, and simulations with the support of newer technology.

Ethics Committee Approval: The study was approved by the Committee for Ethics of Medical Experiments on Human Subjects, Turkish National Ministry of Health (Protocol No: 2020-10-15T18_36_39, Approval date: October 16, 2020). The study protocol conforms to the ethical guidelines of the 1964 Declaration of Helsinki and its later amendments.

Informed Consent: Willing to participate and completion of the survey was considered as informed consent for each participant.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – C.O.D., E.P.; Design - C.O.D., E.P.; Supervision - E.P.; Resource - C.O.D., C.V., F.M., T.S.; Materials - C.O.D., C.V., F.M., T.S.; Data Collection and/or Processing - C.O.D., C.V., F.M., T.S.; Analysis and/or Interpretation - C.O.D.; Literature Search - C.O.D.; Writing - C.O.D.; Critical Reviews - E.P.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med. 2020;382(8):727-733. [CrossRef]
2. Hennessy B, Vicari J, Bernstein B, et al. Guidance for resuming GI endoscopy and practice operations after the COVID-19 pandemic. Gastrointest Endosc. 2020;92(3):743-747.e1. [CrossRef]
3. Goyal H, Gajendran M, Boregowda U, et al. Current and future implications of COVID-19 on gastroenterology training and clinical practice. Int J Clin Pract. 2020;74(12):e13717. [CrossRef]
4. Chiu PWY, Ng SC, Inoue H, et al. Practice of endoscopy during COVID-19 pandemic: position statements of the Asian Pacific Society for Digestive Endoscopy (APSDE-COVID statements). Gut. 2020;69(6):991-996. [CrossRef]
5. Gralnek IM, Hassan C, Beilenhoff U, et al. ESGE and ESGENA Position Statement on gastrointestinal endoscopy and the COVID-19 pandemic. Endoscopy. 2020;52(6):483-490. [CrossRef]
6. Sultan S, Altayar O, Siddique SM, et al. AGA institute rapid review of the gastrointestinal and liver manifestations of COVID-19, meta-analysis of International Data, and recommendations for the consultative management of patients with COVID-19. Gastroenterology. 2020;159(1):320-334.e27. [CrossRef]
7. Repici A, Pace F, Gabbiadini R, et al. Endoscopy units and the coronavirus Disease 2019 outbreak: a multicenter experience From Italy. Gastroenterology. 2020;159(1):363-366.e3. [CrossRef]
8. Forbes N, Smith ZL, Spitzer RL, et al. Changes in gastroenterology and endoscopy practices in response to the coronavirus Disease 2019 pandemic: results From a North American survey. Gastroenterology. 2020;159(2):772-774.e13. [CrossRef]
9. Solms L, van Vianen AEM, Theeboom T, et al. Keep the fire burning: a survey study on the role of personal resources for work engagement and burnout in medical residents and specialists in the Netherlands. BMJ Open. 2019;9(11):e031053. [CrossRef]
10. Rodrigues H, Cobucci R, Oliveira A, et al. Burnout syndrome among medical residents: a systematic review and meta-analysis. PLOS ONE. 2018;13(11):e0206840. [CrossRef]
11. Ratnakaran B, Prabhakaran A, Karunakaran V. Prevalence of burnout and its correlates among residents in a tertiary medical center in Kerala, India: a cross-sectional study. J Postgrad Med. 2016;62(3):157-161. [CrossRef]
12. Pereira-Lima K, Loureiro SR. Burnout, anxiety, depression, and social skills in medical residents. Psychol Health Med. 2015;20(3):353-362. [CrossRef]
13. Pawlak KM, Kral J, Khan R, et al. Impact of COVID-19 on endoscopy trainees: an international survey. Gastrointest Endosc. 2020;92(4):925-935. [CrossRef]
14. Ebigbo A, Karstensen JG, Bhat P, et al. Impact of the COVID-19 pandemic on gastrointestinal endoscopy in Africa. Endosc Int Open. 2020;8(8):E1097-E1101. [CrossRef]
15. Goenka MK, Afzalpurkar S, Ghoshal UC, Guda N, Reddy N. Impact of COVID-19 on gastrointestinal endoscopy practice in India: a cross-sectional study. Endosc Int Open. 2020;8(7):E974-E979. [CrossRef]
16. Arantes VN, Martins BC, Seqatto R, et al. Impact of coronavirus pandemic crisis in endoscopic clinical practice: results from a national survey in Brazil. Endosc Int Open. 2020;8(6):E822-E829. [CrossRef]
17. Marasco G, Nardone OM, Maida M, et al. Impact of COVID-19 outbreak on clinical practice and training of young gastroenterologists: a European survey. Dig Liver Dis. 2020;52(12):1396-1402. [CrossRef]
18. Siau K, Iacucci M, Dunckley P, Penman I, EndoTrain Survey Collaborators. The impact of COVID-19 on gastrointestinal endoscopy training in the United Kingdom. Gastroenterology. 2020;159(4):1582-1585.e3. [CrossRef]
19. Stein MB, Sareen J. Clinical practice. Generalized anxiety disorder. N Engl J Med. 2015;373(21):2059-2068. [CrossRef]
20. Pastores SM, Kvetan V, Coopersmith CM, et al. Workforce, workload, and burnout Among intensivists and advanced practice providers: a narrative review. Crit Care Med. 2019;47(4):550-557. [CrossRef]
21. Ong AM. Outrunning burnout in a GI fellowship program During the COVID-19 pandemic. Dig Dis Sci. 2020;65(8):2161-2163. [CrossRef]

22. Lima CKT, Carvalho PMM, Lima IAAS, et al. The emotional impact of coronavirus 2019-nCoV (new coronavirus disease). Psychiatry Res. 2020;287:112915. [CrossRef]
23. Keswani RN, Taft TH, Coté GA, Keefer L. Increased levels of stress and burnout are related to decreased physician experience and to interventional gastroenterology career choice: findings from a US survey of endoscopists. Am J Gastroenterol. 2011;106(10):1734-1740. [CrossRef]
24. Barnes EL, Ketwaroo GA, Shields HM. Scope of burnout Among young gastroenterologists and practical solutions from gastroenterology and other disciplines. Dig Dis Sci. 2019;64(2):302-306. [CrossRef]
25. Tsamakis K, Rizos E, Manolis AJ, et al. COVID-19 pandemic and its impact on mental health of healthcare professionals. Exp Ther Med. 2020;19(6):3451-3453. [CrossRef]
26. American Society for Gastrointestinal Endoscopy. American Society for Gastrointestinal Endoscopy: guidance for trainees during the COVID-19 pandemic. Gastrointest Endosc. 2020;92(3):748-753. [CrossRef]

Supplementary Table 1. COVID-GastroFellow Survey

COVID-GastroFellow Survey

A. Demographic

1. Age:
2. Gender:
   a. Female
   b. Male
3. Marital status:
   a. Single
   b. Married (no kids)
   c. Married (with kids)
   d. Divorced
4. Gastroenterology Fellowship training year
   a. 1st year
   b. 2nd year
   c. 3rd year
5. Current hospital:

B. Endoscopy-related

6. Number of independently performed endoscopic procedures before pandemic
   a. 1-10
   b. 11-20
   c. 21-30
   d. >30
   e. Not started yet
7. Number of independently performed endoscopic procedures during the pandemic
   a. None
   b. 1-10
   c. 11-20
   d. 21-30
   e. >30
   f. Not started before and during the pandemic
8. Procedure types you were able to attend before the pandemic (multiple choice)
   a. Upper GI endoscopy
   b. Lower GI endoscopy
   c. ERCP
   d. EUS
   e. EMR
   f. ESD
   g. Esophageal stenting
   h. Duodenal stenting
   i. Colonic stenting
   j. GI dilatation
   k. Botox injection
   l. Third space endoscopy (POEM etc.)

Others:

9. Procedure types you are able to attend during the pandemic (multiple choice)
   a. Upper GI endoscopy
   b. Lower GI endoscopy
   c. ERCP
   d. EUS
   e. EMR
   f. ESD
   g. Esophageal stenting
   h. Duodenal stenting
   i. Colonic stenting
   j. GI dilatation
   k. Botox injection
   l. Third space endoscopy (POEM etc.)

Others:

10. Did the volume of of standard diagnostic procedures (routine elective diagnostic upper and lower GI endoscopic procedures) decreased due to pandemic?
    a. Not affected
    b. 1-25% decrease
    c. 26-50% decrease
    d. 51-75% decrease
    e. 76-100% decrease
11. Did the volume of standard therapeutic procedures (management of GI bleeding [injection sclerotherapy, variceal banding, argon plasma coagulation, etc.], polypectomy, foreign body removal) decreased due to pandemic?
    a. Not affected
    b. 1-25% decrease
    c. 26-50% decrease
    d. 51-75% decrease
    e. 76-100% decrease

Supplementary Table 1. COVID-GastroFellow Survey (*Continued*)

12. Did the volume of advanced endoscopic procedures (ERCP, EUS, ESD, EMR, Third space endoscopies, etc.) decreased due to pandemic?
    a. Not affected
    b. 1-25% decrease
    c. 26-50% decrease
    d. 51-75% decrease
    e. 76-100% decrease
    f. Not available before the pandemic

C. Personal protective equipment

13. Are you trained for the usage of PPEs by your center? (multiple choice)
    a. No
    b. Yes (face to face)
    c. Yes (virtually)
    d. Yes (written statement)

Other:

14. Do you think that the PPE stocks in your center are sufficient?
    a. Yes
    b. No

Other:

15. Did your hospital demand a decrease in the volume of endoscopic procedures during the pandemic? (multiple choice)
    a. No
    b. Yes (due to lack of PPE)
    c. Yes (due to general precautionary measures)

Other:

D. General and psychological well-being

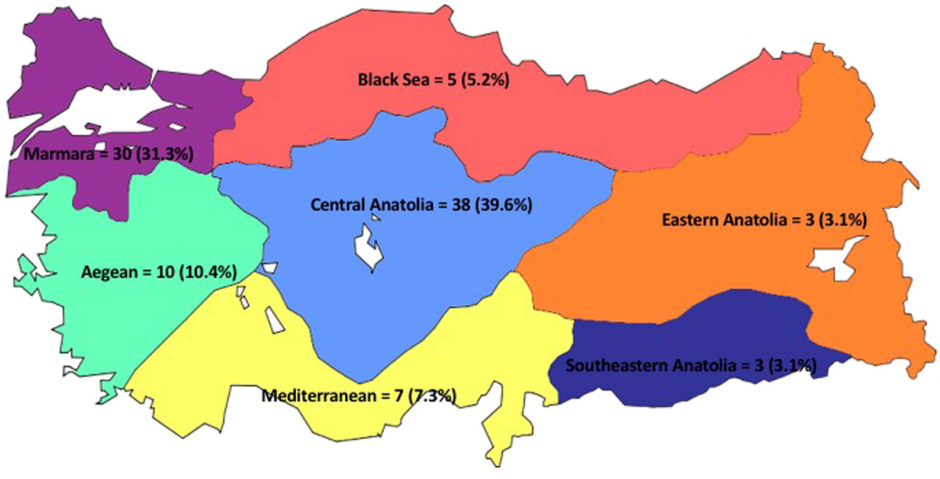
16. Did you stay away from work due to COVID-19? (multiple choice)
    a. Yes (i got infected)
    b. Yes (my family members got infected)
    c. No
17. Have you got tested for COVID-19 during the pandemic (multiple choice)
    a. Yes (disease suspicion)
    b. Yes (precautinory)
    c. Yes (hospital's demand)
    d. No
18. If you got tested for COVID-19, what was the result?
    a. Pozitive
    b. Negative
19. Are you concerned for SARS-CoV2 exposure during the endoscopy training?
    a. No
    b. Slightly
    c. Moderate
    d. Highly
    e. Not started yet
20. Are you concerned that the pandemic might have a negative impact on your endoscopic skills?
    a. No
    b. Slightly
    c. Moderate
    d. Highly
    e. Not started yet
21. Are you concerned for an extension in your training period due to the pandemic?
    a. No
    b. Slightly
    c. Moderate
    d. Highly
    e. Undecisive
    f. I am willing to extend
22. How often do you feel yourself anxious during the pandemic?
    a. Everyday, every second
    b. Everyday, but seldom
    c. A few days a week
    d. Once in a month
    e. Never
23. Did you notice any change in your character and/or attitude during the pandemic? (Multiple choice)
    a. Did not notice
    b. I got more aggressive
    c. My interest to GI field has decreased
    d. Turned out to be a total different person
    e. My concentration at work has decreased
    f. Other:

Supplementary Table 1. COVID-GastroFellow Survey (*Continued*)

24. Do you think that it got harder to focus on endoscopic procedures or your procedural success has decreased? (Multiple choice)
    a. Yes (alienated due to break in procedures)
    b. Yes (concern for COVID-19 exposure)
    c. No
    d. Other:
25. Do you feel yourself burned-out during the pandemic? (Multiple choice)
    a. No
    b. Rarely stressfull, not energetic as i was before the pandemic
    c. Definitely feeling physically and emotionally burned-out
    d. I am burned-out, but it was present before the pandemic as well
    e. Seriously considering resignation and changing my job
    f. Other
26. Does your center deliver any type of support for your anxiety or burnout syndrome ?
    a. Yes (with meetings)
    b. Yes (other)
    c. No

E. Educational

27. What are your efforts to preclude vocational incompetency due to COVID-19 pandemic?
    a. Face to face educational meetings (local center)
    b. Virtual educational meetings (local center)
    c. National online meetings
    d. International online meetings
    e. Webinars of Turkish Society of Gastroenterology
    f. Articles from journals
    g. Social media
    h. Other:
28. Do you think that published guidelines / position statements during the COVID-19 pandemic are sufficient?
    a. Yes
    b. No
29. Did your academic or work related reading decrease due to pandemic?
    a. Yes
    b. No
30. Did your interest and action in scientific research decrease due to pandemic?
    a. Yes
    b. No
31. Did your ability to reach and consult to your mentors / consultants in endoscopy unit changed due to pandemic?
    a. No
    b. Slightly harder than it was before pandemic
    c. Significantly harder than it was before pandemic
    d. Easier than it was before pandemic
32. Did your ability to reach and consult to your mentors / consultants in outpatient clinic changed due to pandemic?
    a. No
    b. Slightly harder than it was before pandemic
    c. Significantly harder than it was before pandemic
    d. Easier than it was before pandemic



Supplementary Figure 1. Distribution of participants across regions of Turkey.

Supplementary Table 2. Logistic regression analysis for pandemic-related burnout syndrome in gastroenterology fellows

	Univariate analysis	Multivariate analysis		
	P	Odds ratio	95 % CI	*P*
Age, years	0.871			
Female gender	0.916			
Being married	0.636			
Having children	0.644			
Years of training				
0-1 (reference)				0.105
1-2	0.079	0.362	0.114-1.149	0.085
2-3		0.387	0.133-1.131	0.083
Decrease in variety of procedures	0.147			
Decrease in independently performed procedures	0.364			
Decrease in standard diagnostic procedures	0.758			
Decrease in standard therapeutic procedures	0.517			
Decrease in advanced endoscopic procedures	0.479			
Getting education for PPE usage	0.814			
PPE adequacy	0.090	1.928	0.713-5.216	0.196
Stayed away from work due to COVID-19	0.593			
Decrease in work performance	0.362			
Concerns for prolongation of training period	0.063	2.034	0.772-5.358	0.151
Tested for COVID-19 disease	0.344			
Experiencing suspicion of COVID-19 disease	0.374			
Being infected with COVID-19	0.529			
Getting psychological support	0.645			
Guideline adequacy	0.827			
Decrease in academic/work related reading	0.938			
Decrease in research activities	0.269			
Decrease in reachability to consultant	0.194			

COVID-19, Coronavirus-2019 disease, CI: Confidence interval, PPE: Personal protective equipment.

Author Queries

JOB NUMBER: 20201110

JOURNAL: TJG

Q1 Please provide the ORCID Id's for Cavansir Vahabov.

Q2 Please provide the significance of the bold characters.