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Virtual Interviews During the COVID-19 Pandemic: A Survey of Advanced Endoscopy Fellowship Applicants and Programs

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Abstract

BACKGROUND AND AIMS: Advanced endoscopy (AE) fellowship interviews during the 2020 application cycle were held virtually due to COVID-19 pandemic. This study aimed to characterize the application experience with virtual interviews.

METHODS: Applicants and programs participating in the 2020 AE fellowship match were prospectively sent separate 17-question surveys. Responses were collected using Research Electronic Data Capture.

RESULTS: In total, 63/104 applicants (60.6%) matched and 64/71 (90.1%) positions filled within the match. The survey was completed by 37/87 (42.5%) applicants and 71 interviewers from 43/65 (66.2%) participating programs. Most applicants (64.7%) preferred a 1:1 applicant:faculty ratio and a 20-minute interview (73.5%), which was used by programs 50.7% and 47.8%, respectively. The majority of applicants (82.4%) and interviewers (76.8%) reported overall satisfaction with virtual interviews. The biggest limitations for applicants were getting a "feel" for the program and endoscopy unit. In the future, 41.2% of applicants preferred only virtual interviews compared to 7.2% of interviewers ($P < 0.01$). Conversely, 14.7% of applicants preferred only in-person interviews compared to 39.1% of interviewers ($P = 0.01$). Half of the interviewers (50.7%) would negatively view applicants who chose a virtual option over an in-person interview if both were offered.

CONCLUSION: The majority of AE fellowship applicants and programs reported overall satisfaction with virtual interviews during the COVID-19 pandemic. Given the potential benefits, virtual interviews may have an increasing role in future residency and fellowship applications. Programs that conduct virtual interviews need to be aware of its limitations and have measures to improve the applicant experience and mitigate potential biases of interviewers.

Keywords: Virtual interviews; Advanced endoscopy fellowship; Gastroenterology fellowship; Applicants; Program directors; COVID-19; Residency; Fellowship.

Introduction

Advanced endoscopy (AE) fellowship interviews are held annually for gastroenterology fellows interested in pursuing a career in interventional endoscopy. The application cycle for this non-Accreditation Council for Graduate Medical Education fellowship typically begins in the spring with match results available in the summer. The majority of applicants are gastroenterology fellows who are nearing the end of their second year of general gastroenterology fellowship. The process has become more formalized in recent years as the number of positions has increased over time. There were 10 AE fellowship positions in the United States in 2000 compared to over 65 positions presently.[1] The American Society for Gastrointestinal Endoscopy (ASGE) provides an online platform to facilitate a match that is fair and equitable for both applicants and programs.[2] However, a handful of programs accept candidates outside of the match.

AE fellowship is an intensive hands-on training experience where fellows work closely with a handful of faculty for extended periods of time to learn endoscopic ultrasound, endoscopic retrograde cholangiopancreatography, and a variety of other complex endoscopic procedures. The training experience is unlike any prior education for the trainee and is more akin to a skilled apprenticeship. Thus, it is critical for a trainee to choose a program that best suits his or her needs and for the program to identify a trainee with whom they can invest significant time and energy developing the individual's cognitive and hands-on skills. Therefore, in-person interviews have often been considered mandatory prior to applicant selection. This year, the deadline for AE fellowship application completion was

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What You Need to Know

Background

Advanced endoscopy fellowship interviews were forced to be held virtually during the 2020 application cycle due to the COVID-19 pandemic. This survey study aimed to characterize the applicant and program experience with the virtual format.

Findings

Most respondents reported satisfaction with virtual interviews. Applicants preferred a 1:1 faculty ratio with 20-minute format. Programs were less willing to consider future virtual-only formats and half would negatively view applicants choosing this interview option.

Implications for patient care

Given their benefits, virtual interviews are likely to have a role in future application cycles. Programs must understand limitations of this format and have measures to improve applicant experience and mitigate potential biases.

February 28, 2020 with the intended first date that programs could offer interviews being March 16, 2020.[2]

The coronavirus disease 2019 (COVID-19) was first reported in Wuhan, China in December 2019 and quickly evolved into a worldwide pandemic shortly thereafter.[3] The first case of COVID-19 in the United States was reported on January 20, 2020.[4] As of November 7, 2020, there are over 48.8 million cases worldwide with 1,234,839 deaths across 219 countries.[5] In the United States, there have been 9.6 million total cases and 234,264 reported deaths.[6] The quick spread of COVID-19 in the United States during spring 2020 greatly disrupted the 2020 AE fellowship application cycle. Given increasing concerns for viral transmission and widespread implementation of social distancing measures and travel restrictions, the program interview offer date was postponed by a month, the match deadline was extended, and AE fellowship interviews at programs across the United States were held virtually. To date, no studies have evaluated both the applicant and program experiences with virtual residency or fellowship interviews during the COVID-19 era.

The goal of our study was to survey AE fellowship applicants and programs to better understand their experience with virtual interviews. The primary aim was to assess applicant and interviewer satisfaction with the virtual interview format. The secondary aims were to understand applicant and program preferences regarding virtual interview format and future interview format options and to assess importance of factors contributing to rankings of both applicants and programs during this application cycle.

Methods

In this prospective study, we surveyed applicants and programs participating in the 2020 AE fellowship match. Applicants that applied to the Mayo Clinic Rochester (Minnesota) AE fellowship program were directly invited to complete the survey. The program directors of all programs listed on the official ASGE match website as participating in the 2020 AE fellowship match (asgematch.com) as of July 16, 2020 were also directly invited to complete the survey. Program directors were encouraged to circulate the survey to other AE and non-AE faculty members and AE fellow interviewers that participated in the virtual interviews at their program. We did not request program directors at other programs to circulate the survey to applicants that applied to their respective programs. Separate survey questionnaires were sent to applicants and programs. The estimated time required to complete the survey was approximately 5 minutes. The survey was reviewed by the Institutional Review Board at Mayo Clinic and deemed exempt from a formal review.

The applicant survey consisted of 17 questions (Supplementary Figure 1). Applicants were asked about the following: location, number of virtual interviews, optimal applicant:faculty ratio and length of interviews, satisfaction with understanding the fellowship program and structure, and exposure to current fellows and faculty; factors that impacted their rank list, limitations and benefits of virtual interviews, and preferences for future interview format. If the applicant participated in no virtual interviews, their survey stopped at question 3 (number of virtual interviews in which they participated) and no additional survey questions were asked.

The program survey also consisted of 17 questions (Supplementary Figure 2). Interviewers were asked about the following: their role in the AE fellowship, number of virtual interviews performed, most common ratio of applicant:faculty and length of interviews, satisfaction with understanding the applicant's background, interpersonal skills, professionalism, and ability to expose applicants to current fellows and faculty; factors impacting rank list, overall level of satisfaction with virtual interviews, and preferences for future interview format. If the interviewers participated in no interviews, their survey stopped at question 3 (number of virtual interviews in which they participated) and no additional survey questions were asked.

Applicants and interviewers were requested to complete the survey electronically using a survey link provided in an email invitation that was sent in the fourth week of July 2020. One- and two-week reminders to complete the survey were sent to applicants and programs. The deadline to complete the survey was August 10, 2020. All survey responses were kept confidential and stored on a secured data spreadsheet.

Survey results and study data were collected and managed using Research Electronic Data Capture (REDCap) electronic data capture tools hosted at Mayo Clinic (version 9.5.33).[7,8] REDCap is a secure, web-based software platform designed to support data capture for research studies, providing (1) an intuitive interface for validated data capture; (2) audit trails for tracking data

manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for data integration and interoperability with external sources.

Continuous variables are represented as mean and standard deviation (SD) whereas categorical variables are expressed as number (n) along with percentages (%). Categorical variables and percentages were compared using the chi-square and Fisher's exact tests to determine statistical significance when appropriate. A P value <0.05 was considered statistically significant. All the analytics were performed using Microsoft Excel (Microsoft Corporation, 2010).

Results

In the 2020 AE fellowship match, there were 104 applicants. At the time of the survey, 65 programs were offering a total of 73 AE fellowship positions. Of the 104 applicants, 63 matched for an applicant match rate of 60.6%. Of the 73 AE fellowship positions, 2 programs withdrew one position each, and thus 64/71 (90.1%) positions were filled in the match.

Advanced endoscopy applicants

The applicant survey was completed by 37 of 87 (42.5%) applicants that were contacted. These applicants were geographically diverse, including 7 (18.9%) from Northeast United States, 14 (37.8%) Midwest United States, 7 (18.9%) South United States, 1 (2.7%) West United States, and 8 (21.6%) outside the United States lower 48 states.

Due to the COVID-19 pandemic and the option for virtual interviews, 15 (40.5%) applicants interviewed at a greater number of programs than originally planned, 13 (35.1%) at approximately the same number of programs, and 9 (24.3%) at fewer programs (Table 1). Applicants interviewed at a mean (SD) number of 10.7 (6.5) programs, with 23 (62.2%) interviewing at 10 or more programs. Three (8.1%) applicants did not interview at any programs and did not answer the additional survey questions.

According to the applicants, the most optimal applicant:faculty ratio was considered to be 1:1 followed closely by 1:2 (Table 1). Both 1:1 and 1:2 applicant:faculty ratios were statistically preferred by applicants over larger interview formats. The optimal length of time for each interview was considered to be 20 minutes (73.5%). No applicant considered interview duration more than 30 minutes to be optimal.

Table 1. Applicant responses regarding virtual interview acceptances and format preferences.

	Applicant responses (n = 37)
Because of COVID-19 and the option for virtual interviews, did you interview at less or more programs than you had planned to?	
A lot less	6 (16.2%)
A little less	3 (8.1%)
About the same	13 (35.1%)
A little more	6 (16.2%)
A lot more	9 (24.3%)
*Mean (SD; 95% CI) rank of optimal applicant:faculty ratio (1 = least preferred; 4 = most preferred)**	
1:1	3.29 (1.12; 3.10–3.49)
1:2	3.06 (0.55; 2.86–3.25)
1:3	2.29 (0.63; 2.10–2.49)
1:4 or more	1.35 (0.92; 1.19–1.51)
*Optimal length of time for each individual interview (minutes)**	
15	5 (14.7%)
20	25 (73.5%)
30	4 (11.8%)
45	0
60	0

*Denominator for these variables was 34 individuals as three applicants did not participate in any virtual interviews.

Satisfaction with virtual interview components

The majority of applicants (82.4%) reported overall satisfaction with virtual interviews (Table 2). Compared to their predetermined thoughts on virtual interviews, 50.0% applicants reported that their actual virtual interview season experience was above expectations while 15 (44.1%) reported that it met expectations.

The majority of applicants reported being satisfied with their ability to understand the clinical responsibilities at each fellowship program (76.5%), academic and educational expectations (85.3%), procedural volume (79.5%), and job placement after fellowship completion (82.4%; Table 2). Fewer (61.7%) applicants felt they got a "feel" for each fellowship program and its culture. Half the applicants reported satisfaction with understanding of the facilities (including endoscopy unit), while nearly 25% were dissatisfied and another 25% neither satisfied nor dissatisfied. The vast majority of applicants were satisfied with exposure to current AE fellows (73.5%) and faculty (82.4%), and the opportunity to have their questions answered (91.2%).

Fellowship ranking factors

Applicants ranked the reputation of the program, procedural volume, and mentorship opportunities as the most important factors impacting their ranking of fellowship programs and postinterview communication as least important (Figure 1). Thirteen (38.2%) applicants felt that the virtual interview experience was at least a major

Table 2. Applicant satisfaction with various components of virtual interviews.

	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied or dissatisfied	Somewhat satisfied	Extremely satisfied	Not applicable
Overall level of satisfaction	0	1 (2.9%)	5 (14.7%)	17 (50.0%)	11 (32.4%)	-
Program characteristics						
Get a "feel" for each fellowship program and its culture	1 (2.9%)	7 (20.6%)	5 (14.7%)	13 (38.2%)	8 (23.5%)	0
Clinical responsibilities (e.g., call schedule)	0	4 (11.8%)	4 (11.8%)	11 (32.4%)	15 (44.1%)	0
Academic and educational expectations	1 (2.9%)	2 (5.9%)	2 (5.9%)	11 (32.4%)	18 (52.9%)	0
Procedural volume offered	1 (2.9%)	2 (5.9%)	4 (11.8%)	11 (32.4%)	16 (47.1%)	0
Where fellows obtain jobs	2 (5.9%)	1 (2.9%)	2 (5.9%)	14 (41.2%)	14 (41.2%)	1 (2.9)
Understanding of the facilities, including endoscopy unit	3 (8.8%)	6 (17.6%)	8 (23.5%)	13 (38.2%)	4 (11.8%)	0
Exposure to current AE fellows	1 (2.9%)	6 (17.6%)	2 (5.9%)	14 (41.2%)	11 (32.4%)	0
Exposure to AE faculty	1 (2.9%)	2 (5.9%)	3 (8.8%)	15 (44.1%)	13 (38.2%)	0
Opportunity to get questions answered	1 (2.9%)	1 (2.9%)	1 (2.9%)	9 (26.5%)	22 (64.7%)	0

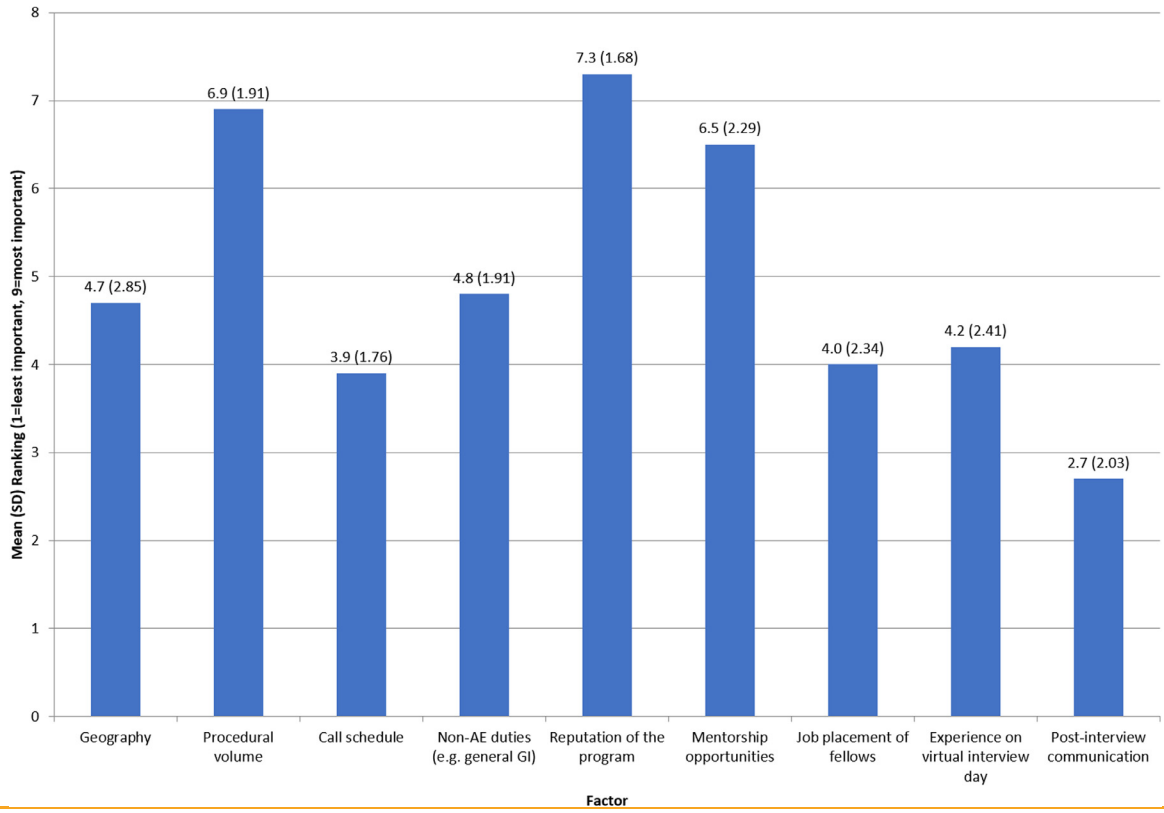

Figure 1. Ranking of factors that impacted applicant ranking of fellowship programs during the 2020 application cycle (1 = least important; 9 = most important).

Table 3. Applicant ranking of limitations and benefits of the virtual interview format.

	Applicants (n = 34)
Mean (SD) rank of the limitations with various aspects of virtual interviews (1 = smallest limitation; 6 = biggest limitation)	
Not enough exposure to AE faculty	2.5 (1.52)
Not enough exposure to AE fellows	2.9 (1.54)
Did not get a good "feel" for the city/life outside the program	3.1 (2.05)
Did not get a good "feel" for the staff (e.g., nurses, techs)	3.6 (1.46)
Did not get a good "feel" for the endoscopy unit	4.1 (1.32)
Did not get a good "feel" for the program and institution	4.8 (1.27)
Mean (SD) rank of the potential benefits with virtual interviews (1 = least important; 5 = most important)	
Less pressure on interviews	2.0 (1.17)
Ability to interview at more AE fellowship programs	2.4 (1.42)
Shorter interview day schedule	2.6 (0.82)
Did not need to use personal vacation days to attend interviews	3.4 (1.02)
Cost savings (with flights, hotels, travel, etc.)	4.6 (0.92)

factor in how they ranked the program while 13 (38.2%) were neutral.

Limitations and benefits of virtual interview format

The biggest limitations with virtual interviews according to the applicants were that they did not get a good "feel" for the program and institution nor a good "feel" for the endoscopy unit (Table 3). Cost savings was viewed as the biggest benefit with virtual interviews whereas less pressure on interview day was considered the least important potential benefit of virtual interviews (Table 3). Nearly three-fourths (73.5%) of applicants reported that they would consider going to a program without ever visiting the institution or city in-person and only 1 (2.9%) applicant would not.

Advanced endoscopy programs

The program survey was completed by 71 interviewers, including 41 (57.7%) AE fellowship program directors, 28 (39.4%) AE faculty, 1 (1.4%) non-AE GI faculty, and 1 (1.4%) AE fellow. Among the 65 programs participating in the 2020 ASGE fellowship match, we received responses from interviewers at 43 programs (66.2%). At 17 (26.2%) programs, more than 1 interviewer completed the survey.

Approximately half (52.1%) the interviewers surveyed reported interviewing the same number of applicants this year compared to years prior, while 24 (33.8%) reported interviewing a greater number and 10 (14.1%) reported interviewing fewer (Table 4). The mean (SD) number of

Table 4. Interviewer virtual interview baseline characteristics.

	AE program individual responses (n = 71)
Compared to years prior, how many applicants did you interview this year?	
A lot less	2 (2.8%)
A little less	8 (11.3%)
Same number	37 (52.1%)
A little more	16 (22.5%)
A lot more	8 (11.3%)
*Most common ratio of applicant:faculty**	
1:1	35 (50.7%)
1:2	15 (21.7%)
1:3	11 (15.9%)
1:4 or more	8 (11.6%)
*Length of interview slots (minutes)**	
15	2 (2.9%)
20	33 (47.8%)
30	29 (42.0%)
45	1 (1.4%)
60	4 (5.8%)
*Compared to years prior, how much time did you spend screening each application prior to selecting candidates for interview?**	
A lot less	0
A little less	1 (1.4%)
Same amount	56 (81.2%)
A little more	9 (13.0%)
A lot more	3 (4.3%)

*Denominator for these variables was 69 individuals as two applicants did not participate in any interviews.

virtual interviews in which interviewers participated was 11.6 (5.0). Two (2.8%) interviewers did not participate in any virtual interviews and did not answer additional survey questions.

The most common ratio of applicant:faculty ratio for virtual interviews was 1:1 (50.7%; Table 4). The majority of interviews were 20 (47.8%) or 30 (42.0%) minutes long. The majority of interviewers (81.2%) reported spending the same amount of time screening each application as years prior before selecting candidates for interview, while 12 (17.4%) reported spending more time and 1 (1.4%) reported spending less time.

Satisfaction with virtual interview components

More than three-fourths (76.8%) of program interviewers reported overall satisfaction with virtual interviews (Table 5). Compared to their predetermined thoughts on virtual interviews, 39 (56.5%) rated that their experience with applicants was above expectations and 29 (42.0%) felt it met expectations.

Table 5. Interviewer satisfaction with various virtual interview components.

	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied or dissatisfied	Somewhat satisfied	Extremely satisfied	Not applicable
Overall level of satisfaction	0	8 (11.6%)	8 (11.6%)	41 (59.4%)	12 (17.4%)	-
Applicant characteristics						
Applicant's background	1 (1.4%)	1 (1.4%)	4 (5.8%)	27 (39.1%)	36 (52.2%)	0
Interpersonal skills	1 (1.4%)	6 (8.7%)	8 (11.6%)	38 (55.1%)	16 (23.2%)	0
Professionalism	1 (1.4%)	2 (2.9%)	11 (15.9%)	36 (52.2%)	19 (27.5%)	0
Career aspirations	1 (1.4%)	3 (4.3%)	5 (7.2%)	36 (52.2%)	24 (34.8%)	0
Program characteristics						
Ability to highlight endoscopy units and other facilities	12 (17.4%)	22 (31.9%)	8 (11.6%)	17 (24.6%)	9 (13.0%)	1 (1.4%)
Applicant exposure to AE faculty	0	9 (13.0%)	16 (23.2%)	25 (36.2%)	19 (27.5%)	0
Applicant exposure to current AE fellows	3 (4.3%)	17 (24.6%)	8 (11.6%)	20 (29.0%)	15 (21.7%)	6 (8.7%)

The majority of interviewers reported being satisfied with understanding of applicant background (91.3%), interpersonal skills (78.3%), professionalism (79.7%), and career aspirations (87.0%) (Table 5). Thirty-four (49.3%) interviewers reported dissatisfaction with their ability to highlight endoscopy units and other facilities. The majority of interviewers reported satisfaction with applicant exposure to AE faculty (63.8%), but fewer interviewers were

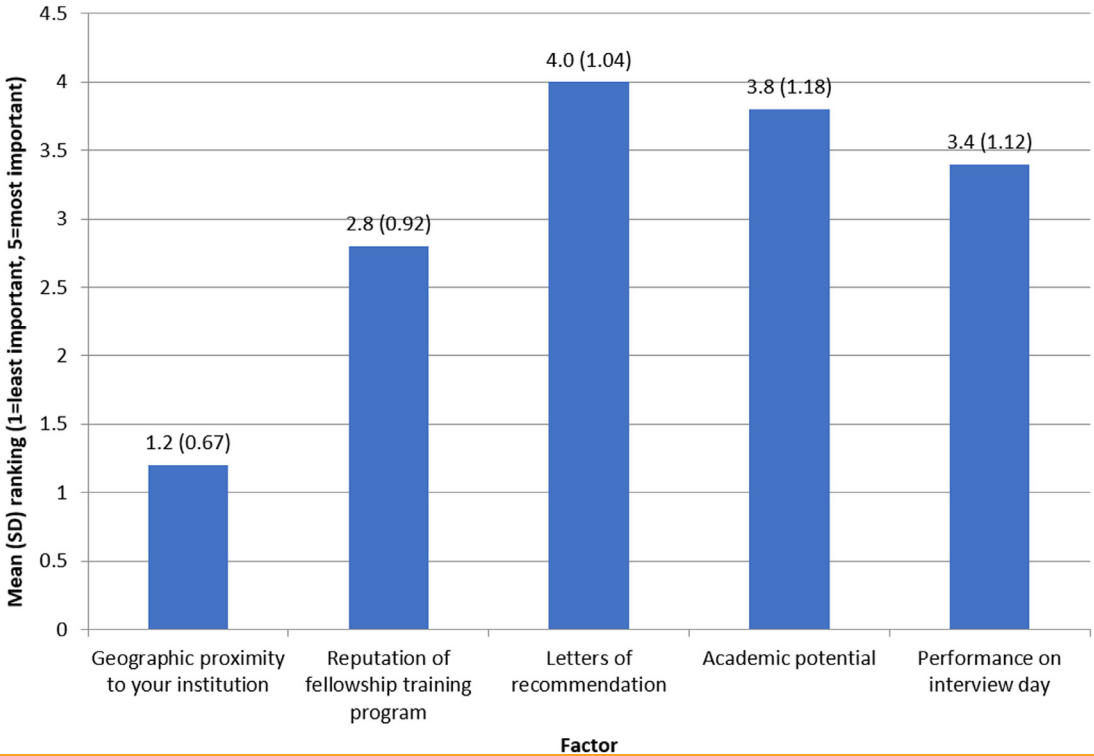

Figure 2. Ranking of factors that impacted interviewer ranking of fellowship applicants during the 2020 application cycle (1 = least important; 5 = most important).

satisfied with exposure to current AE fellows (50.7%). Forty-five (65.2%) interviewers reported that applicants received dedicated time to ask questions to current AE fellows.

Fellowship ranking factors

Among factors that impacted ranking of fellowship applicants, interviewers rated letters of recommendation and academic potential as the two most important factors and geographic proximity to the institution as least important (Figure 2). The majority of individuals (75.4%) felt that applicant performance on the virtual interview day was at least somewhat of a major factor on the final rank list.

Comparison of survey responses between applicants and programs

Interviewers (75.4%), more often than applicants (38.2%), felt that the virtual interview day played a big factor on the final rank list ($P< 0.01$). There were no differences between the two groups in overall level of satisfaction with virtual interviews ($P= 0.19$) and rating of actual virtual interview experience compared to predetermined thoughts on virtual interviews ($P = 0.37$).

Future interview format preferences for applicants and programs

In the future, 41.2% of applicants preferred only virtual interviews compared to 7.2% of interviewers ($P< 0.01$). Conversely, 14.7% of applicants preferred only in-person interviews compared to 39.1% of interviewers ($P = 0.01$; Table 6). If offered both an in-person interview and virtual interview option, 41.2% applicants reported that they would likely choose a virtual interview over an in-person interview option, 23.5% might or might not, and 35.3% would not. When asked if a future applicant was offered both a virtual and in-person interview option and chose the virtual option, 50.7% of the interviewers viewed this potential applicant as somewhat uninterested and 30.4% viewed this potential applicant as neither interested nor uninterested compared to if they had chosen an in-person interview option.

Discussion

In this prospective study, we surveyed applicants and programs participating in the 2020 AE fellowship match. To our knowledge, this is the first study to describe virtual interview experiences of both applicants and multiple training programs in the COVID-19 era. The COVID-19 pandemic has negatively impacted medical education and training. Clinicians may worry about the possibility of being exposed at work and transmitting the virus to family members.[9] Other concerns include social isolation, trainee anxiety and burnout, lack of endoscopy experience, and loss of educational opportunities.[9–11] In accordance with public health efforts and the recommendations of the Association of American Medical Colleges, AE fellowship interviews were held virtually this year.[12] However, to date, the impact of virtual interviews on the match process has largely been unknown. This year's 60.6% applicant match rate is similar to prior years, where the match rate has

Table 6. Applicant and program preferences regarding future interview format.

	Applicants (n = 34)	Program interviewers (n = 69)
Going forward, which interview format would you prefer?		
In-person interview only	5 (14.7%)	27 (39.1%)
Virtual interview only	14 (41.1%)	5 (7.2%)
Either but not both	6 (17.6%)	10 (14.5%)
Combination of both	9 (26.5%)	27 (39.1%)
If you were offered both an in-person interview and virtual interview option, how likely would you be to choose a virtual interview over an in-person interview option?		N/A
Definitely would not	2 (5.9%)	-
Probably would not	10 (29.4%)	-
Might or might not	8 (23.5%)	-
Probably would	10 (29.4%)	-
Definitely would	4 (11.8%)	-
If an applicant was offered both a virtual and in-person interview option and chose the virtual option, how would you view this applicant's level of interest in your program compared to if they had chosen an in-person interview option?	N/A	
Extremely uninterested	-	0
Somewhat uninterested	-	35 (50.7%)
Neither interested nor uninterested	-	21 (30.4%)
Somewhat interested	-	9 (13.0%)
Extremely interested	-	4 (5.8%)

historically been around 60%.[1,13] In addition, the numbers of applicants and program positions available through the match have largely been unchanged despite the pandemic. In 2018, there were 90 AE applicants for 69 positions and in 2014, there were 108 applicants for 66 positions.[1,13]

In this study, most applicants and interviewers engaged in the same, or greater, number of interviews than they had originally planned to, despite the COVID-19 pandemic. The increase in the number of interviews, in some cases, was likely due to the ease of virtual interviews, since travel and associated costs were not a factor. Applicants felt that a 1:1 followed by 1:2 applicant:faculty ratio were the most optimal. Given the limited "screen space" in a virtual setting with multiple interviewers, close interaction between applicants and interviewers may not be possible if a large number (e.g., >2) of interviewers are present in one session. Additionally, both applicants and interviewers may not be able to focus for long periods of time in a virtual setting, as compared to in-person, and interview times greater than 20 minutes may not be preferable for this reason. During an interview day for a surgical oncology fellowship program during the COVID-19 pandemic, virtual activities were conducted during a shorter period of time compared to in-person interviews to keep applicants focused.[14] The Association of American Medical Colleges has outlined various virtual interview tips for program directors and best practices for conducting interviews.[15,16] A carefully crafted structured interview day may have a significant positive impact on the applicant's perception of the program. An organized virtual interview may signal that the program is committed to applicant's education and success.

The vast majority of applicants and interviewers were satisfied with their virtual interview experience. In contrast, a pre-COVID-19 study with 33 applicants participating in either web-based or on-site interviews for urology residency at an academic center suggested that applicants perceived virtual interviews as less effective compared to those held in-person.[17] However, another pre-COVID-19 study utilizing both in-person and virtual interviews for 16 applicants applying for gastroenterology fellowship found that 81% felt that the virtual option met or exceeded their expectations and 87% stated that virtual options should be available in the future.[18] In our study, 94.1% of applicants felt that virtual interviews met or exceeded their expectations. The high degree of satisfaction underscores the ability of both parties to rapidly adapt and utilize virtual meeting platforms as a result of circumstances posed by the COVID-19 pandemic. From the applicant perspective, the greatest strengths of virtual interviews include cost-savings and lack of need to use personal vacation days to attend interviews, benefits that have been previously described.[17] For the programs, the number of faculty participating in the interview process can be maximized given the flexibility with timing and scheduling of virtual interviews.[19]

The biggest limitation cited by both parties was that applicants could not obtain a good understanding for the endoscopy unit and other facilities. Normally, during in-person interviews, a portion of the interview day for applicants is reserved for a tour of the hospital and the endoscopy unit. A short video dedicated to showcasing the facilities at a program on the virtual interview day could be helpful in this regard. At our AE program, our current AE fellows recorded a virtual tour of our endoscopy units to provide applicants a brief overview of our facilities. An additional limitation according to applicants was difficulty getting a good "feel" for the program. This information is often obtained during social interactions that occur on interview day, but outside of the scheduled interview time. At one surgical oncology fellowship program, a traditional interview day was closely replicated using a virtual meeting platform with which most staff were familiar, sharing information including a welcome packet and interview instructions with applicants prior to interview day, and holding a virtual "happy hour".[20] For our program, we allowed applicants to have a 1-hour informal interactive video session with current fellows to ask questions without faculty present, with the hope of allowing applicants to have a better "feel" of our program in a less formal setting.

A greater proportion of interviewers compared to applicants felt that the virtual interview experience was at least a major factor in their ranking. Given the very limited number of AE positions at each program, interviewers may place a greater emphasis than applicants on the interview day performance in order to determine whether the applicant would be a good fit for their program and if they would work well with faculty and staff.

In the future, most applicants preferred a format of either only virtual interviews or a combination of virtual and in-person interviews. In contrast, most interviewers preferred only in-person interviews or a combination of virtual and in-person interviews. A minority (7.2%) of interviewers preferred only virtual interviews going forward. Furthermore, more than 50% of interviewers would view a candidate who chose a virtual over an in-person interview as somewhat uninterested in their program. Looking beyond the COVID-19 era, virtual interviews will likely be incorporated to supplement or replace the traditional interview format, which is limited by the number of available interview slots, associated with higher costs, and requires personal time for travel. If an applicant is offered a choice of an in-person or virtual interview, programs should have practices in place to mitigate the resultant biases against the applicant who chooses a virtual interview format as being less interested in their program.[21]

This study has a number of notable strengths. First, we had a robust survey completion rate from interviewers, including nearly two-thirds of the fellowship programs participating in the AE match. In addition, we surveyed both applicants and interviewers allowing us to explore perspectives on virtual interviews from both parties. Furthermore, our survey questions were both comprehensive and specific, allowing us to understand multiple facets of virtual interviews. This study also has a

several limitations including its survey-based design, which raises the possibility of response bias. Furthermore, the applicants who were contacted were limited to those who applied to the Mayo Clinic Rochester AE fellowship program. The remaining applicants who did not apply to our program could not be contacted due to privacy restrictions. As such, this may have affected survey responses from applicants. Another limitation of our study is that we did not include AE fellowship programs that did not participate in the 2020 ASGE match. There was no reliable mechanism to identify these programs and thus we elected to restrict survey invitation only to those programs listed on the official ASGE match website. Lastly, the applicant survey completion rate was lower than that from interviewers, but still within an acceptable range.[22]

In this prospective survey study of participants in the 2020 AE fellowship match during the COVID-19 pandemic, the majority of applicants and interviewers reported overall satisfaction with virtual interviews. Applicant and program match rates with virtual interviews were similar to historical match rates that utilized traditional in-person interviews. Given the potential benefits, virtual interviews may have an increasing role in future residency and fellowship applications. Programs that conduct virtual interviews need to be aware of the limitations of this format and have measures to improve the applicant experience and mitigate potential biases of interviewers.

Authors' contributions

Amrit Kamboj: study concept and design; acquisition of data; analysis and interpretation of data; drafting of the manuscript; critical revision of the manuscript for important intellectual content; statistical analysis.

Laura Raffals: study concept and design; analysis and interpretation of data; drafting of the manuscript; critical revision of the manuscript for important intellectual content.

John Martin: study concept and design; analysis and interpretation of data; drafting of the manuscript; critical revision of the manuscript for important intellectual content.

Vinay Chandrasekhara: study concept and design; acquisition of data; analysis and interpretation of data; drafting of the manuscript; critical revision of the manuscript for important intellectual content; statistical analysis; study supervision.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.tige.2021.02.001.

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Conflicts of interest
Dr. Chandrasekhara is on the medical advisory board for Interpace Diagnostics & shareholder of Nevakar Corporation. The other authors have no conflicts of interest or disclosures to report.