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DOI: 10.17235/reed.2022.8327/2021

Link: [PubMed \(Epub ahead of print\)](#)

Please cite this article as:

Prieto-Ortiz Robin German, Blanco-Avellaneda Camilo de Jesús , Cepeda-Vásquez Ricardo , Chimbi Rojas Diana Yanira, Prieto-Ortiz Jhon Edison, Moreira-Ruiz Leticia, Arango-Molano Lázaro Antonio . Impact of the COVID-19 pandemic on digestive endoscopists: an Ibero-American study. Rev Esp Enferm Dig 2022. doi: 10.17235/reed.2022.8327/2021.

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**OR 8327 inglés**

**Impact of the COVID-19 pandemic on digestive endoscopists: an Ibero-American study**

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**Received:** 14/09/2021

**Accepted:** 20/12/2021

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*Conflict of interest: the authors declare no conflict of interest.*

**ABSTRACT**

**Introduction:** the COVID-19 pandemic has seriously affected the world population, and has put health personnel in the spotlight as they are tasked with its management. Given their important role in the current health crisis, physicians have been heavily affected in terms of their professional practice, financial conditions and physical and mental health.

The objective of this study was to determine the consequences of the COVID-19 pandemic for Colombian endoscopists and compare the effects on endoscopists from South America and from Spain.

**Methods:** in June 2021, an electronic survey was sent to 292 endoscopists from Colombia, South America and Spain to determine the impact of the pandemic on their professional practice, economic situation, physical and mental health, and training of the residents under their charge. Participants were recruited via convenience sampling.

**Results:** a reduction in the number of endoscopic procedures was reported by 69.9 % of the respondents, and 72.3 % of endoscopists in Colombia stated that their income had decreased. Regarding the doctor-patient relationship, 43.8 % of the respondents believed it had worsened. In addition, 70.9 % reported having experienced changes in their emotional state, especially those related to feeling sad or depressed, and 56.5 % reported that the pandemic had negatively affected the training of residents. Finally, 24.7 % of endoscopists tested positive for COVID-19, and 19.2 % reported the death of a family member due to COVID-19.

**Conclusion:** the COVID-19 pandemic has had a negative impact on the professional practice, financial situation and physical and mental health of Ibero-American endoscopists. These problems must be identified in a timely manner to develop and implement strategies aimed to prevent their occurrence.

**Keywords:** Pandemic. COVID-19. Endoscopists. Infection. Physical health. Mental health.

## INTRODUCTION

The COVID-19 pandemic is currently the seventh deadliest pandemic in the history of mankind (1). Since it was declared a pandemic by the World Health Organization (WHO) (2), the number of endoscopic procedures has decreased significantly due to the compliance of endoscopists with the recommendations made by several medical associations to slow down the spread of the SARS-CoV-2 virus (3-8). The current pandemic has had occupational, economic, academic, physical and mental health implications, for

both the general population and specifically for endoscopists (9-12).

The main goal of this study was to determine the professional, socioeconomic, physical and mental health consequences of the COVID-19 pandemic in three groups of endoscopists. The results obtained from Colombian endoscopists were compared with those of endoscopists from countries with similar economic conditions and health systems (South America), and also with endoscopists from a first-world country (Spain). A possible relationship between these implications and the outcomes derived from the pandemic in this population were evaluated.

## **METHODS**

This was a cross-sectional analytical study. An electronic survey was used to determine the impact of the COVID-19 pandemic on the professional practice, economic situation, and physical and mental health of endoscopists from Colombia, South America (Argentina, Bolivia, Brazil, Chile, Ecuador, Paraguay, Peru, Uruguay, Venezuela) and Spain. Furthermore, the impact on the training of the residents under the endoscopists charge was also assessed. Participants were recruited by convenience sampling.

The survey was created in Google Forms and consisted of 23 questions, divided into five sections: demographic information (five questions), SARS-COV-2 infection and prevention measures (six questions), occupational information (eight questions), academic information (two questions) and physical and mental health information (two question). The instrument is available at <https://tinyurl.com/awv7xysx>.

The survey was made available through the social networks of the Colombian Association of Digestive Endoscopy (ACED) and the Spanish Association of Gastroenterology websites. It remained open for completion from June 1 to June 30, 2021, and only one response per respondent was accepted. Data anonymity was also ensured. The classification of participants into each of the three groups was achieved by a mandatory response of country of residence of the endoscopist. There were no restrictions regarding the work setting of respondents as Colombia and South America health care is provided in various contexts (health insurance companies, private consultations, state institutions), while in

Spain the State is the main responsible for health care provision.

Data processing was performed using the Microsoft Excel software. Comparative tables were created using the data obtained in each group. Likewise, data were described using absolute and relative frequencies. A bivariate and a multivariate analysis were performed, and measures of association (relative risk) were calculated.

## RESULTS

A total of 292 responses were included: 101 participants (34.6 %) were from Colombia, 127 (43.5 %) from South America and 64 (21.9 %) from Spain. Most respondents were male ( $n = 195$ ) (66.8 % vs 33.2 %). A decrease in the number of endoscopic procedures was reported by 69.9 % of the respondents, being more frequently reported by Colombian (77.2 %) and South American (78.0 %) endoscopists than those from Spain (42.2 %). Regarding the doctor-patient relationship, 43.8 % of the respondents believed it had worsened and 44.5 % stated that it had remained the same (Table 1).

Regarding income, 72.3 % of Colombian endoscopists reported a decrease and a similar frequency was observed in the South American group (69.3 %). However, only 14.1 % of the participants living in Spain reported having experienced a reduction in income. In addition, an increase in the costs of the supplies needed for the operation of endoscopy units was reported by 62.5 %, 71.7 % and 21.9 % of the respondents from Colombia, South America and Spain, respectively (Table 2).

In relation to the effects of the COVID-19 pandemic, 56.5 % of the respondents believed that it has had a negative impact on the training of residents. In addition, 54 % participants stated that online training resources do not compensate for face-to-face academic training, which was affected by the reduction in the number of endoscopic procedures. However, such resources should continue to be used as an academic tool according to 56.6 % of the respondents.

At the beginning of the pandemic, 96.6 % participants complied with infection prevention protocols. However, 15 months later, at the time of completing the survey, only 90 % complied with the protocols, and this reduction was more significant in the Spanish

endoscopists group (98.4 % vs 73.4 %). Regarding SARS-CoV-2 infection rates, 24.7 % of the respondents had had COVID-19, which was more frequent in the South American endoscopists group (30.7 %). Of these, 23.6 % reported having some type of sequelae. Finally, 19.2 % of participants reported the death of a family member due to causes related to the pandemic (Table 3).

Most participants (70.9 %) reported having experienced changes in their emotional state as a consequence of the pandemic. Feeling sad or depressed was the most frequent mental health symptom (69.2 %), but other symptoms such as irritability, work-related and economic concerns and concerns about the academic training of their students was also reported by more than half of respondents. In addition, all endoscopists expressed concerns about the negative consequences for their patients' health as they were unable to perform endoscopic procedures and reach a diagnosis in a timely manner (Table 4). According to the relative risk, Colombian (RR = 2.7) and South American (RR = 3.2) endoscopists were more than two times more likely to experience emotional problems as a result of the pandemic than endoscopists from Spain (RR = 1.28).

## **DISCUSSION**

### **Work-related and economic effects of the COVID-19 pandemic**

The pandemic has caused a significant reduction in the number of endoscopic procedures worldwide (13,14), which is similar to that described in the present study by most of the respondents working in Colombia and South America. In this regard, according to a study in which a survey was administered to 163 endoscopists in 48 countries, a decrease in the number of procedures performed was experienced in 99 % of the endoscopy units. In fact, four units (2.4 %) stopped performing these procedures (15).

More than 70 % of participants from Colombia and South America reported that their income had decreased by up to 75 %. However, in the case of endoscopists working in Spain, only 14 % reported having experienced such a decrease. In addition, according to 57.5 % of the respondents, the cost of the supplies required for the operation of endoscopy units increased during the pandemic, which was more frequent in the



Colombian and the South American endoscopists groups.

Worldwide, unemployment rates have increased and some companies have even closed down due to the pandemic. The need to use personal protective equipment (PPE) and making infrastructure adjustments to reduce the risk of SARS-CoV-2 infection in the healthcare settings has contributed to the reduction of the revenue for healthcare provision-related activities. In fact, some private hospitals in the United States have reported that their income has decreased by 50 to 60 %, and up to 80 % in some institutions dedicated only to the performance of diagnostic procedures (16).

Regarding the doctor-patient relationship, almost half (44.5 %) of participants in the present study believed that it had not changed at all and 43.8 % reported that it was worse. In particular, the proportion of endoscopist in the Spanish group who believed this relationship was worse was much higher.

#### **Impact of the COVID-19 pandemic on the training of residents**

In this study, 56.5 % of the respondents believed that training of residents had been negatively affected and 86 % stated that the reduction in the number of endoscopic procedures had also had a negative impact. Furthermore, 56.6 % stated that the online resources implemented during the pandemic should continue to be used as educational tools.

Worldwide, universities and higher education institutions offering health science training programs have been seriously affected by the decrease in the number of procedures as a result of the pandemic (17). In this regard, one study that evaluated the number of procedures performed by gastroenterology residents per year found a notable reduction between 2019 and 2020 (372 vs 113) (18). Given the control and prevention measures implemented worldwide to slow down the spread of COVID-19, including social distancing and human mobility restrictions, several educational methods based on online resources have been used to continue the training of healthcare personnel, especially the use of social networks and online learning platforms (19,20). Likewise, medical associations have made contributions to this end by creating and making learning material available on their

websites. Thus, the training model of healthcare personnel that was based on the performance of a high volume of procedures has been adapted to the use of new educational models such as Internet-based learning (21).

### **Compliance with biosafety measures**

In the present study, 96.6 % of the respondents complied with the PPE protocols at the beginning of the pandemic. However, at the time of completing the survey, this proportion had decreased, especially in endoscopists from Spain. On the contrary, the majority of respondents from South America (93.7 %) and Colombia (96 %) continued to comply with all PPE use protocols.

In this regard, according to a study performed in Spain, health staff still used PPE in 72 of the endoscopy units evaluated (89.2 %). Furthermore, patient screening for COVID-19 was limited to an epidemiological questionnaire or body temperature measurement in six of nine university hospitals, and RT-PCR tests were performed in only four institutions (22).

### **SARS-CoV-2 infection rates and health status**

The overall prevalence of COVID-19 in the sample was 24.7 %, and was higher in South America (30.7 %) and lower in Colombia (17.8 %). Of the 72 endoscopists who had COVID-19, 17 reported having some type of sequelae. In this sense, a study performed in France found that only 12.8 % of endoscopists had had a confirmatory PCR test for SARS-CoV-2, which corresponded to only one third of the physicians who experienced COVID-19 symptoms. This could be explained by the availability of confirmatory tests in the country at that time (23).

Several strategies aimed to reduce the risk of infection in health personnel have been developed (24), including home care (25), the reduction of face-to-face medical visits (26) and telemedicine, which has increased by 260.7 % during the pandemic (14). Despite all these measures, high SARS-CoV-2 infection and hospitalization requirement rates have been reported in healthcare staff (27).



Several studies have described a high rate of infection in health personnel. In Spain, approximately 40.900 COVID-19 cases in healthcare staff were reported during the first months of the pandemic (28). In Colombia, 61.261 health workers had had COVID-19 and 301 had died as of July 6, 2021. Auxiliary nurses were the most affected, followed by physicians (10.246 cases) (29).

A study performed in Spain found that 172 physicians (10.6 %) had been infected or were currently infected at the time of the study. Of these, 73.3 % were professional physicians and 26.7 % were residents. In addition, according to this study, 19 of these physicians required hospitalization and one died (22).

### **Impact of the pandemic on mental health**

Based on the results of the present study, endoscopists in Colombia and South America were more than two times more likely to develop mental health problems as a result of the pandemic compared to those in Spain. In addition, 69.2 % of the respondents reported feeling sad or depressed, and other symptoms such as irritability, work-related concerns, economic concerns and concerns about the academic training of their students were also observed in more than half of participants. Finally, it is worth noting that all participants expressed being worried about the negative consequences for their patients' health as they were unable to perform endoscopic procedures in a timely manner.

A systematic review and meta-analysis found that anxiety and depression rates increased in the general population during the initial phase of the pandemic, and that there were no significant differences with healthcare workers (30). This finding differs from most studies addressing this topic, which have described that the prevalence of emotional disorders is higher in health workers than in the general population. One narrative review found that factors such as the lack of PPE, burnout, frustration, job insecurity, social isolation, family estrangement and discrimination by the general population due to their constant exposure to the virus have had a considerable impact on the mental health of healthcare workers. Thus, they are more likely to suffer from anxiety, depression, suicidal ideation, sleep disorders and drug and alcohol addiction (31).

A systematic review found that anxiety occurred in 9 to 90 % of health workers (median prevalence: 24 %). In addition, depression prevalence ranged between 5-51 % (ME = 21 %), sleep disorders between 34-65 % (ME = 37 %) and distress between 7-97 % (ME = 37 %). Furthermore, family or social support is the protective factor most commonly associated with a reduced risk of developing mental health problems (32). Another study found that concern worsened in 30 % of participants, fear in 15 % and anxiety in 12 % (33). Financial difficulties significantly increased stress and anxiety, thus constituting an increased risk of developing mental disorders (34).

Another study reported that 95.2 % of respondents felt that life would probably never be normal again, and all participants said they feared both dying alone and being buried without religious burial rituals. In addition, according to this study, eight healthcare workers reported the death of a family member due to COVID-19 and feeling guilty for their death (35).

In our study, 86 % of the respondents stated they had kept living together with their families during the pandemic. Furthermore, it is worth noting that a high percentage of endoscopists (19.2 %) reported the death of a family member due to causes directly related to the COVID-19 pandemic, which has so far not been described in the relevant literature.

The main limitation of this study is the relatively low number of surveys that were completed and thus considered for analysis. Despite the almost mandatory adoption of online resources due to the current pandemic, this is a frequent situation in this type of study. However, this is one of the first studies to assess the perceived impact of the COVID-19 pandemic on endoscopists.

## **CONCLUSIONS**

Based on the data obtained in each of the three groups of endoscopists, the reduction in both income and the number of endoscopic procedures was higher in Colombia and South America than in Spain. Even though a greater decrease was observed in Spain in the proportion of participants who followed the PPE use protocols at the time of survey, there

were less COVID-19 cases in the group of endoscopists living in Spain than in the South American group. This is possibly due to the different times in which the COVID-19 outbreak, and thus, the pandemic started in each region.

Constant surveillance of the physical and mental health status of healthcare personnel during the pandemic is recommended, as well as a comprehensive approach to this problem that also considers economic and work-related aspects.

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**Table 1. Work-related effects of the COVID-19 pandemic on Ibero-American endoscopists**

	<i>Colombia</i>		<i>South America</i>		<i>Spain</i>		<i>Total</i>	
	<i>(n = 101)</i>		<i>(n = 127)</i>		<i>(n = 64)</i>		<i>(n = 292)</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
<i>Number of endoscopic procedures</i>								
Increased	4	4.0	11	8.7	16	25.0	31	10.6
Decreased	78	77.2	99	78.0	27	42.2	204	69.9
Remained the same	19	18.8	17	13.3	21	32.8	57	19.5
<i>% of decrease in the number of procedures</i>								
< 25 %	19	18.8	23	18.1	18	28.1	60	20.5
25-50 %	42	41.5	51	40.2	7	10.9	100	34.3
50-75 %	14	13.9	15	11.8	1	1.6	30	10.2
> 75 %	3	3.0	10	7.9	1	1.6	14	4.8
Not applicable	23	22.8	28	22.0	37	57.8	88	30.2
<i>Doctor-patient relationship</i>								
It worsened	47	46.5	39	30.7	42	65.6	128	43.8
It improved	10	9.9	19	15.0	4	6.3	33	11.4
It has not changed	44	43.6	68	53.5	18	28.1	130	44.5
Not applicable			1	0.8			1	0.3

**Table 2. Economic consequences of the COVID-19 pandemic on Ibero-American endoscopists**

	<i>Colombia</i>		<i>South America</i>		<i>Spain</i>		<i>Total</i>	
	<i>(n = 101)</i>		<i>(n = 127)</i>		<i>(n = 64)</i>		<i>(n = 292)</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
<i>Income</i>								
It increased	3	2.9	9	7.1	10	15.6	22	7.5
It decreased	73	72.3	88	69.3	9	14.1	170	58.2
It remains the same	25	24.8	30	23.6	45	70.3	100	34.3
<i>% of income decrease</i>								
< 25 %	22	21.8	27	21.3	7	10.9	56	19.1
25-50 %	39	38.7	44	37	2	3.1	85	29.2
50-75 %	11	10.8	11	8.7			22	7.5
> 75 %	1	1.0	6	4.7			7	2.4
Not applicable	28	27.7	39	28.3	55	86	122	41.8
<i>Costs of supplies</i>								
They decreased	4	4.0	12	9.4	2	3.1	18	6.2
They are the same	8	7.9	15	11.8	11	17.2	34	11.6
They increased < 25 %	25	24.8	35	27.6	8	12.5	68	23.3
They increased 25-50 %	25	24.8	31	24.4	4	6.3	60	20.5
They increased 51-75 %	8	7.9	15	11.8			23	7.9
They increased > 75 %	5	5.0	10	7.9	2	3.1	17	5.8
Not applicable	26	25.7	9	7.1	37	57.8	72	24.7

**Table 3. Use of protective personal equipment (PPE) and COVID-19 infection rate by Ibero-American endoscopists**

Colombia			South America		Spain		Total	
(n = 101)			(n = 127)		(n = 64)		(n = 292)	
n %			n %		n %		n %	
Use of PPE at the beginning of the pandemic								
Yes	99	98.0	120	94.5	63	98.4	282	96.6
No	2	2.0	7	5.5	1	1.6	10	3.4
Use of PPE at the time of survey completion?								
Yes	97	96.0	119	93.7	47	73.4	263	90.0
No	4	4.0	8	6.3	17	26.6	29	10.0
Did you test positive for COVID-19?								
No	83	82.2	88	69.3	49	76.6	220	75.3
Yes	18	17.8	39	30.7	15	23.4	72	24.7
Do you have COVID-19 sequelae								
(n)	18		39		15		72	
No	15	83.3	29	74.4	11	73.3	55	76.4
Yes	3	16.7	10	25.6	4	26.7	17	23.6
Did any of your family members die from COVID-19?								
No	81	80.2	99	78.0	55	85.9	235	80.5
Yes	20	19.8	27	21.3	9	14.1	56	19.2
Not applicable	0	0.0	1	0.7	0	0.0	1	0.3

**Table 4. Impact of the COVID-19 pandemic on the emotional state of Ibero-American endoscopists**

	<i>Colombia</i>		<i>South America</i>		<i>Spain</i>		<i>Total</i>	
	<i>(n = 101)</i>		<i>(n = 127)</i>		<i>(n = 64)</i>		<i>(n = 292)</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
<i>Have you experienced changes in your emotional state?</i>								
Yes	74	73.3	97	76.4	36	56.3	207	70.9
No	27	26.7	30	23.6	28	43.7	85	29.1
<i>Do you feel...</i>								
Irritable	52	51.5	62	48.8	33	51.6	147	50.3
Sad o depressed	68	67.3	91	71.7	43	67.2	202	69.2
Are you worried about your employment status?	71	70.3	77	60.6	13	20.3	161	55.1
Are you worried about your economic condition?	70	69.3	83	65.4	11	17.2	164	56.2
Are you worried about the training of the students you are in charge of?	56	55.4	91	71.7	31	48.4	178	61.0
<i>Are you worried about the negative impact on your patients' health of delaying or being unable to perform endoscopic procedures?</i>								
Yes	101	100.0	127	100.0	64	100.0	292	100.0