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Impact of the COVID-19 Pandemic on Clinical Schedules and Physical and Mental Well-Being of Gastroenterology Nonphysician Healthcare Workers

A Nationwide Survey

ABSTRACT

COVID-19 was declared a pandemic in March 2020 by the World Health Organization. To minimize exposure and because of limited personal protective equipment resources, most gastroenterology practices were curtailed/modified during the surge, with slow reopening to a normal/semi-normal schedule. Gastroenterology healthcare workers have been impacted greatly by COVID-19, resulting in job and wage insecurity. The aim of our study was to understand the impact of COVID-19 on gastroenterology healthcare workers across the United States. A web-based survey, consisting of 40 questions, was disseminated among gastroenterology practices across the United States via en masse e-mails and direct contact by authors. In total, 223 gastroenterology healthcare workers completed the survey; 56.1% were from academic settings. COVID-19 impacted the work schedule of 85.2% of participants, with reduced weekly work hours (38.1%), duty reassignment (22.4%), and furlough (13.9%). Uncertainty about job and/or future wages/benefits after reopening was noted in 41%, which was significantly associated with the presence of physical (p = .021) and mental/emotional symptoms (p = .045). Worsening of pre-existing physical and/or mental/emotional conditions was observed in 53%. Inadequate personal protective equipment availability, lack of temporary housing and/or childcare facilities, as well as job insecurity appear to be the important factors leading to worsening physical/mental/emotional conditions among gastroenterology healthcare workers.

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The COVID-19 pandemic has had a significant impact on gastroenterology (GI) practices globally (World Health Organization, 2020). Several investigators have assessed its impact on GI endoscopy, with a focus on change in endoscopic volumes, availability of personal protective equipment (PPE), and modifications in endoscopy units to mitigate infection transmission (Barret, Gronier, & Chaussade, 2020; Parasa et al., 2020; Repici et al., 2020). In addition, GI clinics have expanded telehealth capabilities, which were recently studied by our group (Keihanian, Sharma, Goyal, Sussman, & Girotra, 2020). Researchers have also highlighted the impact of COVID-19 on GI training (Keihanian et al., 2020; Mejía Pérez & Sharma, 2020; Siau, Iacucci, Dunckley, & Penman, 2020). Moreover, recent publications have emphasized issues concerning reopening, including concerns of endoscopy staff, given the exposure risk (Rex, Vemulapalli, Lahr, et al., 2020), as well as patient perspectives (Rex, Vemulapalli, Kane, et al., 2020). The COVID-19 pandemic has impacted physical and mental well-being of healthcare workers (HCWs) across various levels of patient care, and has been an emerging focus of interest (Kang et al., 2020; Luo, Guo, Yu, Jiang, & Wang, 2020).

A cohort of HCWs who have thus far been understudied and underrepresented is GI nonphysician healthcare workers (GI-NPHCWs), including registered nurses (RNs), technicians (Techs), medical assistants (MAs), and patient care coordinators (PCCs). The present study aimed to investigate the impact of COVID-19 on NPHCWs across the United States (U.S.).

Methods

A web-based survey link was distributed to GI practices (academic and nonacademic) nationwide via en masse e-mails and direct contact by authors requesting distribution among GI-NPHCWs. The survey instrument consisted of 40 questions pertaining to the impact of COVID-19 on work schedule/employment, reassignment of duties, exposure to COVID-19, availability of PPE, and physical and mental/emotional well-being.

Detailed Methodology

Study Design and Development

Our multicenter web-based survey was conceptualized on MS Word and subsequently finalized using University of Miami (UM) REDCap electronic data capture platform. The survey instrument was tested and critiqued independently by all authors, and two external independent reviewers (R.R.A. and J.G., who are not coauthors but acknowledged for their contributions) to ensure functionality and ease of comprehension. This study was presented at UM Institutional Review Board and judged as exempt (per Federal Regulation 45 C.F.R. 46.104) and approved (#20200775).

Survey Distribution

A REDCap-generated distributable link, without any login requirements (https://redcap.miami.edu/surveys/?s=7DLLM7KTKH), was disseminated among GI/hepatology care providers, requesting distribution among their endoscopy and clinic nonphysician staff. To facilitate survey distribution and encourage participation, a short draft describing the nature of the study and its goal was attached to the original e-mail.

All authors independently shared the survey link via en mass e-mails with their personal GI contacts and friends at academic and nonacademic medical centers, in urban, semi-urban, and rural areas of the United States (U.S.). In addition, e-mails were sent to Advanced Endoscopy Program Directors (e-mails available on the ASGE website), who are usually Directors of Endoscopy at their respective institutions, seeking assistance in distribution to their GI staff.

The initial survey link was distributed via en masse e-mails by all authors on June 25, 2020, followed by a reminder e-mail/text message after a week, to ensure dispersion among different geographical regions of the U.S. and into varied practice settings. The survey was closed after 3 weeks, on July 16, 2020. For this study, "before COVID-19" was defined as up until February 2020, "during COVID-19" as March–May 2020, and "reopening" as June–2020 onward. All respondents "agreed" with participation in this study, and consent was obtained as a mandatory question before survey participation.

Statistical Analysis

Data were reported as mean ± standard deviation and frequency (%). Individual survey item responses were reported as the proportion of total respondents engaging in the question that answered affirmatively. The Shapiro–Wilk test was used to compare normality of data. The Wilcoxon signed ranked test was used to compare means before, during, and after the COVID-19 pandemic. An independent-samples t test was used to compare means between academic and nonacademic settings. A chi-square test was used for associations between categorical variables. All statistical analyses were performed with the SPSS 23.0 (IBM Corp, Armonk, NY) statistical software. A p value of less than .05 was considered to be statistically significant.

Results

Overview

In total, 223 participants completed the survey (procedure room RNs, 43.5%; preprocedure/postprocedure area RNs, 19.3%; outpatient clinic RNs, 20%; Techs, 15%; MAs, 7.2%; PCCs, 2.7%; and endoscopy leaders, 3.2%), with 56.1% respondents from academic settings. Geographically, the majority of responses were from the Southeast (45.3%) and Midwest (31.8%) regions, followed by Northeast (12.1%) and West (9.9%). The detailed survey instrument with results is summarized in Table 1.

Work Schedule/Employment

COVID-19 disrupted the work schedule of 85.2% of GI-NPHCWs, with reduced weekly work hours (38.1%), reassignment (22.4%), and furlough (13.9%). The most common reassignments included preprocedure COVID-19 testing sites (16.3%) and critical care units (15.3%). Importantly, 20.2% expressed being inadequately trained prior to reassignment.

During the COVID-19 phase (March–May 2020), 25.2% reported repurposing of the GI endoscopy unit for patient care or administrative purposes. The number of endoscopic procedures per day decreased significantly during the COVID-19 phase (from 15.6 ± 11.77 to 3.44 ± 4.12, $p < .001$), with a gradual increase to 12.44 ± 10.73 after "reopening" ($p < .001$), although still lower than pre-COVID-19 baseline. Similar patterns were noted for outpatient clinic encounters (Table 2).

Exposure and PPE Availability

Most healthcare facilities implemented some type of patient screening upon entry, but 22.9% reported lack of routine daily screening for HCWs. In total, 22.9% reported notification of a COVID-19-positive patient contact within 14 days of exposure, and 24.3% reported being tested (by PCR/serology), of whom one tested positive; 35.9% indicated that undergoing COVID-19 testing was difficult to impossible at their center. They recounted that 5.68 ± 11.17 GI-NPHCWs tested for COVID-19, with 0.94 ± 4.08 having positive results, 1.55 ± 3.32 were symptomatic, and 1.47 ± 2.09 needed to quarantine. The mean number of GI-NPHCWs requiring quarantine was higher in academic centers (1.75 vs. 1.12, $p = .044$).

Common measures employed by GI-NPHCWs to limit exposure to their family members included changing out of hospital attire (70%) and showering (65.5%) before family contact, and social distancing at home (52.9%). Only 12.1% reported temporary housing assistance from their healthcare facility, but 32.7% required assistance from family members for childcare due to closed childcare centers/schools.

Negative pressure room usage was reported by 32.7% for all endoscopies and 19.7% for only advanced procedures. In total, 75.8% reported using most essential PPE (N95, face shield) in all endoscopic cases, and 87% reported these were made available by their facility, with 37.2% reported replacement was provided in 4–7 days during the COVID-19 phase. However, 26.5% of GI-NPHCWs indicated that PPE was less often available to them than to the physicians.

Physical and Mental/Emotional Well-Being

Fifty-three percent of respondents reported worsening of their pre-existing physical and/or mental/emotional conditions. The commonest new physical symptoms were lethargy (36.7%), body aches (42.15%), headaches (34%), and poor appetite/weight loss (32.3%), whereas the most common mental/emotional symptoms were anxiety (69.5%), sleep disturbances (56%), mood changes (49.32%), depression (38.1%), and inability to concentrate (30.5%).

Stratified Analysis

Forty-one percent of respondents expressed uncertainty either about their job or future wages/benefits after reopening, and this was significantly associated with the presence of physical ($p = .021$) and mental/emotional symptoms ($p = .045$). Conversely, among those who reported furlough during the COVID-19 phase (RN endoscopy: $n = 10$; RN outpatient: $n = 11$; Tech: $n = 6$; MA: $n = 4$; PCC: $n = 1$), there was a significant correlation with less physical and/or mental/emotional symptoms ($p = .003$).

Providing direct care for COVID-19 patients (reported by 22.9%) was associated with worsening physical condition ($p = .056$). Furthermore, N95 mask use was associated with worsening physical symptoms ($p = .036$), whereas lack of essential PPE availability was associated with emotional symptoms ($p = .027$).

Discussion

This is among the first studies from the U.S. focusing exclusively on GI-NPHCWs, delineating their challenges due to decreased endoscopic volumes and in-person clinic encounters consequent to COVID-19. The overall impact included disrupted work schedules (85.2%), with decreased shifts, paid/unpaid leave, reassignment of duties, and furloughs; consequently, more than 50% reported worsening of their pre-existing physical/mental/emotional conditions. It is hard to fathom, but equally important to highlight, that amidst

TABLE 1. Survey Instrument With Results

1. What one term best describes your role?
- GI nurse (work primarily in procedure rooms of the endoscopy unit): **97, 43.49%**
- GI nurse (work primarily in preprocedure/postprocedure areas of the endoscopy unit): **43, 19.28%**
- GI nurse (work primarily in the GI outpatient clinic): **20, 8.97%**
- GI Tech: **33, 14.8%**
- Clinic MA: **16, 7.17%**
- Clinic PCC: **6, 2.69%**
- Endoscopy leader: **7, 3.14%**
- Other: **1, 0.45%** (Did not specify)

2. In which type of facility do you primarily work at (>50% of your time)?
- University hospital: **86, 38.56%**
- University-affiliated hospital: **25. 11.2%**
- Hospital—not university affiliated: **40, 17.93%**
- Freestanding ambulatory center/private practice: **37, 16.6%**
- VA Hospital: **9, 4.03%**
- County hospital: **12, 5.38%**
- Other (please specify): **12, 5.38%** (medical center, oncology hospital, satellite ambulatory center, GI investigatory company)
- Missing: **2**

Total responses: **221**
Academic: **125, 56.1%**
Nonacademic: **96, 43%**

3. Which city do you work in?

4. Which state do you work in?
Geographical region:
Northeast: **27, 12.1%**
Southeast: **101, 45.3%**
Midwest: **71, 31.8%**
Southwest: **1, 0.4%**
West: **22, 9.9%.**

5. How many of the following support staff members do you have at your institution (Please provide your best estimate)?
- GI nurses: **19.62 ± 14.05**
- GI Techs: **5.99 ± 5.43**
- Clinic MAs: **1.67 ± 4.48**
- Clinic PCCs: **1.12 ± 1.92**

6. Please choose ONE of the following that best applies to how your work schedule has been affected by COVID-19.
- No effect: **33, 14.8%**
- Reduced weekly hours: **85, 38.12%**
- Relocated to another unit: **50, 22.4%**
- Furlough: **31, 13.9%**
- Paid leave: **9, 4.04%**
- Mandatory unpaid vacation days: **3, 1.35%**
- Not assigned because of pre-existing medical condition: **3, 1.35%**
- Other (Please specify): **9, 4.03%** (increased hours, remote working from home, changed assignment to leadership)

7. If relocated/reassigned, where were you deployed during this time?
- Not applicable: **97, 43.9%**
- Preprocedure COVID-19 testing center: **18, 8.1%**
- Critical care units (MICU, SICU, CCU, etc.): **17, 7.2%**
- General floor (medical or surgical): **16, 6.9%**
- Specialized COVID-19 care units: **15, 6.7%**
- Emergency department: **12, 5.4%**
- Not relocated, but was on standby: **30, 13.45%**
- Other (Please specify): **33, 14.8%** (float nurse, preclinic COVID-19 screening, entry screening ($n = 8$), COVID-19 call center ($n = 5$), donning and doffing, home-based office ($n = 2$), respiratory tent, research, transportation ($n = 2$), dialysis ($n = 2$), clinic ($n = 2$), human resources, COVID-19 sample collection site)

(*continues*)

TABLE 1. Survey Instrument With Results (*Continued*)

8. If you were relocated/reassigned, what was the duration of this reassignment?
- Not applicable: **143, 64.1%**
- <4 weeks: **24, 10.8%**
- 4–8 weeks: **38, 17%**
- >8 weeks: **18, 8.1%**

9. If relocated/reassigned, were you provided with necessary training required to render services in the new assigned role?
- Not applicable: **78, 35%**
- No: **55, 24.7%**
- Yes, but inadequately: **45, 20.2%**
- Yes, and adequately: **42, 18.8%**

10. As a "GI Endoscopy RN/Tech," how many endoscopic procedures did you assist in per day?
- Before COVID-19 (up until February 2020): **15.6 ± 11.77**
- During COVID-19 (between March and May 2020): **3.44 ± 4.12**
- After reopening (June 2020 and onward): **12.44 ± 10.73**

11. As a "GI clinic RN/PCC," how many clinic days did you work per week?
- Before COVID-19 (up until February 2020): **5.02 ± 6.037**
- During COVID-19 (between March and May 2020): **3.52 ± 5.10**
- After reopening (June 2020 and onward): **4.78 ± 5.402**

12. As a "GI clinic RN/PCC," how many patients did you assist each clinic day?
- Before COVID-19 (up until February 2020): **22.64 ± 18.87**
- During COVID-19 (between March and May 2020): **7.05 ± 8.87**
- After reopening (June 2020 and onward): **17.39 ± 15.25**

13. Have you provided direct care to COVID-19-positive patients in the GI unit?
- Yes: **51, 22.9%**
- No: **171, 76.7%**

14. Approximately how many COVID-19-positive patient procedures have you assisted in (since March 2020)? **1.19 ± 3.197**

15. Did your institution provide you with training in PPE (donning/doffing), caring for COVID-19 patients, and frequent in-services as the situation evolved?
- Yes, and adequately: **146, 65.5%**
- Yes, and inadequately: **53, 23.8%**
- No: **17, 7.6%**

16. Was your GI unit repurposed during the COVID-19 pandemic?
- No: **159, 71.3%**
- Yes, endoscopy services were curtailed/closed, and GI endoscopy area was used for "COVID-19 patient care": **10, 4.5%**
- Yes, endoscopy services were curtailed/closed, and GI endoscopy area was used for "non-COVID-19 patient care": **24, 10.8%**
- Yes, endoscopy services were curtailed/closed, and GI endoscopy area was used for "administrative" purpose: **22, 9.9%**

17. Have you ever been notified about a patient who became COVID-19-positive within 14 days after an endoscopic procedure in your endoscopy unit?
- Yes: **51, 22.9%**
- No: **167, 74.9%**

18. Have you ever been notified about a patient who became COVID-19-positive within 14 days after an endoscopic procedure in which YOU were directly involved?
- Yes: **24, 10.8%**
- No: **193, 86.5%**

19. Were you tested for COVID-19?
- Asymptomatic and not tested: **149, 66.8%**
- Asymptomatic and tested by antigen or PCR: **24, 10.8%**
- Asymptomatic and tested by antibody/serology: **18, 8.1%**
- Symptomatic but not tested (only quarantined): **2, 0.9%**
- Symptomatic and tested by antigen or PCR: **10, 4.5%**
- Symptomatic and tested by antibody/serology: **2, 0.9%**
- Missing info: **18, 8.07%**

(*continues*)

TABLE 1. Survey Instrument With Results (*Continued*)

20. If you were checked, did you test positive or negative?
- Positive: **1, 0.4%**
- Negative: **63, 28.3%**

21. How would you rate ease of arranging for COVID-19 testing for "symptomatic" healthcare workers (physician or staff) at your institution (based on personal experience or observation)?
- Easy: **91, 40.8%**
- Difficult: **54, 24.2%**
- Exceedingly difficult: **20, 9%**
- Impossible: **6, 2.7%**

22. To the best of your knowledge, how many GI healthcare staff (RN, Techs, MAs/PCCs) at your institution have already been tested for COVID-19?5.68± 11.17

*23. To the best of your knowledge, how many GI healthcare staff (RNs, Techs, MAs/PCCs) at your institution have already been tested "POSITIVE" for COVID-19?***0.94 ± 4.08**

*24. To the best of your knowledge, how many GI healthcare staff (RN, Techs, MAs/PCCs) at your institution developed "symptoms" of COVID-19?***1.55 ± 3.32**

*25. To the best of your knowledge, how many GI staff (RNs, Techs, MAs) at your institution had to "quarantine" as the result of COVID-19?***1.47 ± 2.096**

26. During the COVID-19 period, what measures did you take to minimize exposure and protect your families?
- Changed out of hospital attire (clothes, shoes) before entering the house: **156, 70%**
- Took a shower as soon as reaching home and before contact with any family members: **146, 65.5%**
- Remained socially distanced from family members: **118, 52.9%**
- Changed into hospital scrubs upon arriving at work and changing out before leaving the hospital: **110, 49.3%**
- Washed clothing separately from family members: **109, 48.9%**
- Wore mask at home as well: **25, 11.2%**
- Self-restricted to a separate part of the house (basement or garage or outhouse or separate floor): **23, 10.3%**
- Relocated to temporary housing: **5, 2.2%**
- Other (Please specify): **7, 3.1%** (wear mask and gloves while grocery shopping ($n = 2$), children staying with family members ($n = 2$), locking hospital attires at home, frequent house cleaning
- None: **11, 4.9%**

27. Did your facility assist in any way to provide temporary housing to practice social distancing from your family while working with COVID-19 patients?
- Yes: **27, 12.1%** [hotel room ($n = 14$), dorm room ($n = 2$), housing ($n = 1$)]
- No: **173, 77.6%**

28. If you have children, what was your childcare situation while working during COVID-19 time?
- Had family members (spouse, grandparents, elder siblings) take care of children: **73, 32.74%**
- Children continued going to day care or similar care sites: **9, 4%**
- Nanny or care provider: **6, 2.7%**
- Other (Please specify): **38, 17%** [home alone ($n = 14$), take time off from work ($n = 1$)]

29. Does your endoscopy unit practice "daily screening of employees" (by questions regarding well-being, temperature check, symptoms)?
- Yes: **156, 70%**
- No: **51, 22.9%**
- Uncertain: **13, 5.8%**

30. What kind of PPE was provided to you by your facility during endoscopic procedures?
- Surgical mask: **194, 87%**
- N95 mask: **196, 87.9%**
- FFP2-3 respirator: **12, 5.4%**
- Hazmat suit: **7, 3.1%**
- Gloves: **200, 89.7%**
- Hairnet/bouffant:**166, 74.4%**
- Goggles or face shield: **187, 83.9%**
- Water-resistant gown: **160, 71.7%**
- Shoe covers: **171, 76.7%**
- Not provided, I bought personally: **2, 0.9%**

(*continues*)

TABLE 1. Survey Instrument With Results (*Continued*)

31. Do you have negative pressure rooms at your institution's endoscopy unit?
- Yes, used for all endoscopic procedures: **73, 32.7%**
- Yes, used for advanced endoscopic procedures only: **44, 19.7%**
- No: **75, 33.6%**
- I do not know: **26, 11.7%**

32. In what instances is "most essential PPE (N95, face shield)" used in your endoscopy unit?
- All procedures: **169, 75.8%**
- Suspected COVID-19 patients: **34, 15.2%**
- Known COVID-19 patients: **11, 4.9%**
- None: **2, 0.9%**

33. In your opinion, is the PPE made available to GI healthcare staff (RNs/Techs/PCCs/MAs) less often than to the physicians?
- Yes: **59, 26.5%**
- No: **130, 58.3%**
- I do not know/prefer not to answer: **23, 10.3%**

34. How often were you (GI staff/RNs/Techs) offered replacement of "most essential PPE (N95, face shield)" in your endoscopy unit?

During COVID-19:
- Every day: **61, 27.4%**
- Once in 2–3 days: **38, 17%**
- Once in 4–7 days: **83, 37.2%**
- Not available: **16, 7.2%**
- Buy my own: **3, 1.3%**

After reopening
- Every day: **84, 37.7%**
- Once in 2–3 days: **30, 13.5%**
- Once in 4–7 days: **79, 35.4%**
- Not available: **6, 2.7%**
- Buy my own: **3, 1.3%**

35. How often were you (GI staff/RNs/Techs) offered replacement of "moderately essential PPE (shoe covers, surgical face masks, gown, hairnet, double long gloves)" in your endoscopy unit?

During COVID-19
- Every day: **154, 69.1%**
- Once in 2–3 days: **21, 9.4%**
- Once in 4–7 days: **17, 7.6%**
- Not available: **10, 4.5%**
- Buy my own: **0, 0%**

After reopening
- Every day: **161, 72.2%**
- Once in 2–3 days: **12, 5.4%**
- Once in 4–7 days: **19, 8.5%**
- Not available: **6, 2.7%**
- Buy my own: **1, 0.4%**

36. Did your wages, benefits, or available workdays diminish after reopening (or you anticipate in near future)?
- Yes: **75, 33.6%**
- No: **120, 53.8%**
- Uncertain: **17, 7.6%**
- Prefer not to answer: **6, 2.7%**

37. After reopening, how secure do you feel with your job and salary?
- Adequately secure about job and salary: **121, 54.3%**
- Not secure about job and salary: **59, 26.5%**
- Secure about job but not about salary: **34, 15.2%**
- Other: 2, 0.9%

(*continues*)

TABLE 1. Survey Instrument With Results (*Continued*)

38. Have you noted a change in your existing physical or emotional/mental health conditions during the COVID-19 pandemic?

- No change: **96, 43%**
- Worsened existing physical health conditions: **16, 7.2%**
- Worsened existing emotional/mental health conditions: **57, 25.6%**
- Both worsening emotional and physical conditions: **45, 20.2%**

39. Have you suffered any new physical symptoms during the COVID-19 pandemic?

Lethargy
- None: **135, 60.5%**
- Few days a week: **66, 29.6%**
- All the time: **16, 7.2%**
- Missing: **6, 2.7%**

Aches/pains, tired muscles
- None: **123, 55.2%**
- Few days a week: **75, 33.6%**
- All the time: **19, 8.5%**
- Missing: **6, 2.7%**

Frequent cold/infections
- None: **208, 93.3%**
- Few days a week:**8, 3.6%**
- All the time: **0, 0%**
- Missing: **7, 3.1%**

CVS: Tachycardia, chest discomfort
- None: **183, 82.1%**
- Few days a week: **25, 11.2%**
- All the time: **4, 1.8%**
- Missing: **11, 4.9%**

Pulmonary: Increased work of breathing, shortness of breath
- None: **162, 72.6%**
- Few days a week: **39, 17.5%**
- All the time: **9, 4%**
- Missing: **13., 5.8%**

Gastrointestinal: Stomach ache, diarrhea/constipation, nausea, GERD
- None: **158, 70.9%**
- Few days a week: **52, 23.3%**
- All the time: **4, 1.8%**
- Missing: **9, 4%**

Neuro: Headache, nerve tingling/numbness
- None: **139, 62.3%**
- Few days a week: **67, 30%**
- All the time: **9, 4%**
- Missing: **8, 3.6%**

Eating disorder and/or weight gain
- None: **145, 65%**
- Few days a week: **52, 23.3%**
- All the time: **20, 9%**
- Missing: **6, 2.7%**

Poor appetite and/or weight loss
- None: **191, 85.7%**
- Few days a week: **18, 8.1%**
- All the time: 1, 0.4%
- Missing: **13, 5.8%**

Loss of sexual desire/ability
- None: **179, 80.3%**
- Few days a week: **28, 12.6%**
- All the time: **9, 4%**
- Missing: **7, 3.1%**

(*continues*)

TABLE 1. Survey Instrument With Results (*Continued*)

40. Have you suffered any new emotional/mental symptom during the COVID-19 transitions?
Feeling of depression, hopelessness
- None: **133, 59.6%**
- Few days a week: **76, 34.1%**
- All the time: **9, 4%**
- Missing: **5, 2.2%**

Sleep troubles (falling asleep, staying asleep, frequent waking up, affects day work)
- None: **92, 41.3%**
- Few days a week: **104, 46.6%**
- All the time: **21, 9.4%**
- Missing: **6, 2.7%**

Mood changes
- None: **106, 47.5%**
- Few days a week: **96, 43%**
- All the time: **14, 6.3%**

Anxiety symptoms (nervous, worrisome, restless, annoyed/irritable)
- None: **62, 27.8%**
- Few days a week: **126, 56.5%**
- All the time: **29, 13%**
- Missing: **7, 3.1%**

Inability to focus and poor judgment
- None: **151, 67.7%**
- Few days a week: **61, 27.4%**
- All the time: **7, 3.1%**
- Missing: **4, 1.8%**

Note. CCU = coronary care unit; CVS = cardiovascular symptoms; GERD = gastroesophageal reflux disease; GI = gastroenterology; MA = medical assistant; MICU = medical intensive care unit; PCC = patient care coordinator; PPE = personal protective equipment; RN = registered nurse; SICU = surgical intensive care unit; Tech = technician.

a pandemic with devastating effects on healthcare systems, there are nurses who are out of work.

Physical and mental effects of the COVID-19 pandemic have been a matter of research interest and focus of many authorities to decrease the associated and anticipated burnout (Abu-Snieneh, 2021; Lotta, Fernandez, & Corrêa, 2021; Marsaa et al., 2021; Navarro-Correal et al., 2021; Pandey et al., 2021; Poortaghi, Shahmari, & Ghobadi, 2021; Shen et al., 2021). Kang et al. (2020) recently studied 994 medical and nursing staff working in Wuhan during the COVID-19 pandemic and noted 34.4%, 22.4%, and 6.2% with mild, moderate, and severe mental health disturbances, respectively, in the immediate wake of the pandemic. Exposure to patient, family members, colleagues, or friends infected or exposed to COVID-19 was associated with worsening mental health perception among responders (Kang et al., 2020).

Similar to their findings, a predictor of worsening mental well-being according to our survey is the lack of essential PPE availability, leading to greater exposure risk and associated mental stress of potential infection. According to a recent systematic review on 62 studies published during the COVID-19 pandemic, the authors estimated a high pooled prevalence of anxiety (33%) and depression (28%) among pooled populations of HCWs, general public, and people at high risk for COVID-19 (Luo et al., 2020). Among these, people with previous pre-existing conditions were at greatest risk, and our study results support this finding. Furthermore, among HCWs, the prevalence of anxiety and depression was reported to be higher in nurses (30.30%) than in physicians (25.37%) (Pappa et al., 2020). In another study of 534 COVID-19 frontline workers (nurse, 46.4%; doctor, 43.6%), strict infection control guidelines, specialized equipment, recognition of their efforts by hospital management and the government, and reduction in reported cases of COVID-19 provided psychological protective impacts (Cai et al., 2020). These data, along with ours, are all supportive of developing protocols aimed at screening our RNs and other GI-NPHCWs for physical/mental/emotional impacts of COVID-19 pandemic in order to provide adequately for our patients.

Our study noted fewer physical/mental symptoms among furloughed GI-NPHCWs, which is a deviation from the anticipated impact and could be due to a small sample size or possibly a result of stimulus checks ensuring secured monthly wages. Another unique observation is the higher number of quarantined individuals after exposure in the academic setting, which might be a reflection of efficient contact tracing and/or a larger number of providers facilitating easier coverage without workflow disruption. Shortage of available testing kits in the early phases of the pandemic resulted in uncertainty and doubt among HCWs

TABLE 2. Effect of COVID-19 on Clinical Schedules, and Factors Influencing Physical and Mental/Emotional Health of GI Nonphysician Healthcare Staff

A. Effect of COVID-19 on GI Nonphysician Healthcare Staff Clinical Activities			
	Before COVID-19 (Up Until February 2020)[a]	During COVID-19 (Between March and May 2020)[a]	After Reopening (June 2020 and Onward)[a]
Average endoscopies assisted per day[b]	15.6 ± 11.77	3.44 ± 4.12	12.44 ± 10.73
Average clinic days per week[b]	5.02 ± 6.04	3.52 ± 5.10	4.78 ± 5.4
Average patients assisted each clinic day[b]	22.64 ± 18.87	7.05 ± 8.87	17.39 ± 15.25
B. Factors Influencing Physical and Emotional Health of GI Healthcare Staff During COVID-19			
	Effect on Physical Health	Effect on Mental/ Emotional Health	Effect on Both Physical and Mental Health
Reduction of weekly hours	$p = .82$	$p = .81$	$p = .38$
Relocation to another unit	$p = .57$	$p = .53$	$p = .64$
Furlough	$p = .16$	$p =$ **.03** OR = 0.41 (95% CI [0.18, 0.94])	$p =$ **.003** OR = 0.29 (95% CI [0.13, 0.68])
Direct care of COVID-19 patient	$p = .056$	$p = .246$	$p = .34$
Diminishing or perception of diminishing wages, benefits, or available workdays after reopening	$p =$ **.021** OR = 2.11 (95% CI [1.113, 4.01])	$p =$ **.045** OR = 1.82 (95% CI [1.01, 3.28])	$p =$ **.024** OR = 2 (95% CI [1.09, 3.66])
Feeling secured about job and salary	$p = .16$	$p = .053$	$p = .12$
Availability of mandatory PPE on a daily basis	$p = .11$	$p =$ **.027** OR = 0.499 (95% CI [0.27, 0.93])	$p =$ **.014** OR = 0.467 (95% CI [0.25, 0.86])
N95 availability on daily basis	$p =$ **.036** OR = 0.23 (95% CI [0.052, 1.01])	$p = .97$	$p = .45$
Awareness of COVID-19 positivity 14 days after providing direct care	$p = .23$	$p = .54$	$p = .39$
Remained socially distant from family members	$p = .97$	$p = .09$	$p = .25$

Note. GI = gastroenterology.

[a]Significant *p*-values are in bold.

[b]Comparative analysis of "during" versus "before," after "reopening" versus "before," and after "reopening" versus "during," were all statistically significant.

and, most specifically, RNs who were scared to return to work and lived with the knowledge that they might be infected with the virus, imposing risk to their family and loved ones (Turale, Meechamnan, & Kunaviktikul, 2020). In our survey, almost 50% of symptomatic participants experienced difficulties arranging testing for COVID-19 at their institutions. Although with further advances in testing and nationwide distribution of more accurate and efficient testing, patients have noted an ease in the testing process in the past few months; however, this still appears to be an ongoing issue, especially among HCWs.

Limitations

Although our study provides a robust comprehensive overview of work and health determinants of RNs and

GI-NPHCWs amidst the COVID-19 pandemic, it has a few inherent limitations. The relatively small sample size may limit its generalizability. Despite reminder e-mails, our response rate was suboptimal, and this may be a reflection of significant lifestyle compromise most of these RNs/NPHCWs had to make (changed and unpredictable work hours, closure of day care/school requiring additional arrangements with spouse or other family members), all limiting their personal time to respond to surveys. Second, our survey was distributed in the mid-stage of the initial pandemic surge, hence representing barriers/challenges that GI-RN/NPHCWs faced at that time. But within the last few months, many of these factors may have been addressed, such as providing adequate personalized PPE and greater testing availability. A prospective dynamic study can further assess the impact of these changes on mental/physical/emotional well-being of RNs/NPHCWs. Third, given the survey nature of our study, response rates from different geographical regions of the country could not be controlled. In our survey, we received maximum responses from the Southeast and Midwest regions, which authors acknowledge is not a universal representation of healthcare providers throughout the U.S. GI-NPHCWs were relocated to COVID-19 units in many states in highly impacted regions such as New York and Illinois, which only corresponded to 12% of our responders. Larger studies are needed to better investigate the geographic effects of COVID-19 on GI-NPHCWs.

Implications

Our study has several implications for clinical practice. Our survey results highlight the importance of physical and mental/emotional well-being among HCWs, especially GI-NPHCWs. We suggest early screening for emotional distress along with availability of online resources, personalized psychological care, and group counseling for HCWs to assist in this hardship period and prevent burnout. Inadequate PPE availability, lack of temporary housing or childcare facilities, as well as job insecurity appear to be the important factors leading to anxiety and emotional and physical distress among our responders. Healthcare facilities across the U.S. have implemented stringent screening strategies for patients/family members at entry points, but corresponding practices among GI-NPHCWs were uncommon (23%) according to our survey. Although a self-reported system might be the norm for screening HCWs in the U.S., more stringent strategies, as implemented in other countries, should be considered for GI providers/NPHCWs.

Many of our participants adopted a variety of measures to decrease exposure to their households such as changing hospital attire before entering the house, taking a shower as soon as reaching home, maintaining social distance at home, relocating to the basement or garage, as well as wearing a mask at home. Although reassigned to different units, including COVID-19 units, 77.6% of our responders did not receive assistance with temporary housing to practice social distancing from their family members. This posed as a factor impacting their mental/emotional well-being. We suggest hospitals could proceed with better resource allocation and provide temporary housing, especially among frontline RNs/NPHCWs, to limit anxiety and risk of infection exposure, which will go a long way in maintaining the health of our essential workforce.

Conclusion

With a resurgence of COVID-19 cases in several states and insecurity about jobs, there is an underlying sense of unease among GI-NPHCWs, which will continue to impact their physical and mental/emotional well-being and may result in illness or burnout if not adequately addressed. We hope our survey results will help healthcare facilities and GI leadership programs recognize specific issues and implement additional safeguards/support in areas such as providing temporary housing, childcare, and PPE; greater availability of COVID-19 testing; and timely screenings and counseling to maintain physical and mental/emotional well-being. ✪

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