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# Impact of Burnout on Gastrointestinal Symptoms among Egyptian Physicians during Coronavirus Disease 2019 (COVID-19) Pandemic

**Bassma A. Ibrahim[1*], Mona Mostafa[2], and Sarah M. Hussein[1]**

*[1]Department of Public Health, Community Medicine, Environmental Medicine, and Occupational Medicine, Faculty of Medicine, Suez Canal University, Egypt. [2]Department of Internal Medicine, Faculty of Medicine, Suez Canal University, Egypt.*

## Abstract

**Background: Physicians appear to be particularly vulnerable to burnout during the COVID-19 pandemic. This may have significant adverse consequences for workers' well-being and health. The relationship between burnout and gastrointestinal (GI) symptoms is not fully understood. *Aim:* We aimed to determine the prevalence rate of burnout among physicians and investigate its impact on gastrointestinal symptoms. *Subjects and Methods:* A cross-sectional study was carried out among physicians (n=167) in teaching hospitals in Ismailia city, Egypt. An interview questionnaire was used to collect data. The questionnaire assessed burnout syndrome using Maslach Burnout Inventory and assessed the GI symptoms through Gastrointestinal Symptom Rating Scale. *Results:* More than half of studied physicians (56.3%) exhibited burnout criteria, with a prevalence rate of 74.9%, 53.9%, 5and 2.1% for emotional exhaustion, depersonalization, and reduced professional accomplishment, respectively. Emotional exhaustion and depersonalization were identified as predictors of pain or discomfort in the upper abdomen, and nausea. Only emotional exhaustion was found to be a significant predictor of heartburn, bloating, and urgent need to have a bowel movement. While burnout had a significant association with the majority of upper and lower GI symptoms. *Conclusion:* Burnout is highly prevalent among physicians. Burnout dimensions have significant associations with GIT symptoms. Upper GI symptoms are influenced by burnout dimensions more than lower ones. These findings highlight the importance of implementing urgent interventions that minimize both burnout among physicians and the resulting physical consequences.**

***Keywords:*** Burnout, gastrointestinal symptoms, physicians, COVID-19

## Introduction

Working conditions is known to have an impact, positive or negative, on employees' health. Bad working conditions can lead to occupational burnout[(1)]. Burnout syndrome (BOS) is considered a global health concern that affects health care workers including physicians[(2)]. Nearly 30-50% of physicians have described BOS symptoms at specific points of their lives[(3,4)]. BOS is identified as a psycho-

*Corresponding Author: basma_ibraheem@med.suez.edu.eg

logical syndrome that is illustrated by a negative emotional reaction to one's occupation because of prolonged exposure to a stressful work environment[5]. It is a work-related syndrome containing emotional exhaustion (EE), depersonalization (DP), and a sense of reduced personal accomplishment (PA). Emotional exhaustion is characterized by emotional depletion and loss of energy. While, depersonalization is recognized as detachment from work and clients and emotional hardening, but reduced personal accomplishment indicates a feeling of professional or personal inadequacy with reduced productivity and coping skills[6]. Physicians deal with many patients, administrators, and staff. Frequently, they also take care of many issues, such as high expectations, lack of enough time and social support at work, and be responsible for wellbeing and health of others, also patients may have aggressive behaviors and many complaints, and causes of death and injury; all these factors predispose physicians to BOS[7]. An Egyptian cross-sectional study has been conducted on 134 physicians in Aswan University Hospital showed that EE was 50%, DP was 33% and low PA was 39% [8]. Another study has been conducted among residents showed that 81% had high EE, 52.4% had a high level of low PA and 64.3% had DP[9]. In addition, a meta-analysis was done about burnout among health care providers in the middle east showed that prevalence estimates predominantly range between 40 and 60%[10]. Burnout among physicians may be manifested by the expanded risk of medical errors, job dissatisfaction, malpractice lawsuits, and substance misuse and suicidal thoughts [11]. It is a wasting situation for physicians alongside the healthcare sector as a whole[5]. In late 2019, the COVID-19 started to spread worldwide resulting in a global pandemic which was announced by the World Health Organization on Mar 11, 2020[12]. So, BOS is expected to increase during this pandemic, since physicians are facing a huge workload in providing health services. Many physicians are withdrawn or preferred self-isolation after dealing with COVID-19 cases. The concern of infection and lost social support during isolation are crucial factors that expose physicians to burnout[5]. Regarding BOS among Egyptian physicians, an Egyptian cross-sectional study has been conducted on 320 physicians who were facing the outbreak of the COVID-19 pandemic showed high emotional exhaustion (20%), high depersonalization (71%), and low personal accomplishment (39%) among physicians[3]. Also, another Egyptian study has been performed on 220 physicians revealed that 36.36% had BOS, 28.18% had severe EE, 31.82% had severe DP, 89.09% had reduced PA[13]. Moreover, the results of another study revealed that 29.9 % of studied participants had a high level of burnout, 38.8% had high EE, 70.1% had DP, 51% had low PA[14]. Also, among 503 physicians in another study, 72.8% had high burnout levels, 62.2% high EE, 62.4% had high depersonalization levels, and 43.5 % had low PA[15]. BOS may result in adverse consequences for workers' wellbeing, health, families, work environment and organizations. A systematic review summarized that burnout may lead to adverse consequences for workers. It referred that cross-sectional studies have indicated associations between BOS and several health problems. A study considered burnout as a risk factor for gastrointestinal problems[16]. A study has been done among 144 health care workers to assess the impact of BOS on gastroesophageal reflux disease (GERD) and irritable bowel syndrome. It showed that 70.1% of participants had burnout. Among those participants, 42% informed at least 1 monthly episode of GERD, 30% had ulcer-like pain, 28% had dyspepsia and 55% had

symptoms from the lower gastrointestinal system[17]. Although there are various studies conducted to investigate burnout among physicians immediately after the COIVD-19 pandemic, few studies examined the prevalence of BOS after sufficient duration after the occurrence of this pandemic. Also, the impact of BOS on GIT symptoms in details is rarely mentioned even in systematic reviews. To our knowledge, only one letter to editor study is available online which described the impact of burnout on GIT symptoms. Hence, in our study we investigated the prevalence of BOS among physicians after an interval of occurrence COVID-19 pandemic and explore its relationship with GIT symptoms which is still a questionable issue.

## Subjects and Methods

*Study Setting and Population*

This study was performed between October and May 2021 in Suez Canal University teaching hospitals, Egypt. A stratified random sampling was conducted for selecting 167 physicians from both medical and surgical specialties. The sample size was calculated using Epi-info software version 7 based on the following assumption: the proportion of burnout among physicians (89.1%) [18], level of confidence 95% and precision 5% to be 150. Then the sample size increased by 10% to overcome non-response.

*Study Tools*

Data was collected through a structured interview questionnaire. This questionnaire included socio-demographic and work-related questions, evaluation of burnout, and medical history.

*Burnout*

Burnout was evaluated using the Maslach Burnout Inventory MBI–Human Services Survey (MBI-HSS)[19]. The MBI consists of 22 items that assess the three components of burnout namely, emotional exhaustion (EE), depersonalization (DP), and loss of feeling of personal accomplishment (PA). the individuals were positive for EE if they scored ≥27, DP if they scored ≥13, and reduced DP if they had score ≤31. The participants were considered to have a burnout if they scored at least 27 on the exhaustion (EE ≥27) and at least 13 on the depersonalization subscales and or not more than 31 on personal accomplishment (DP ≥13 and/or PA ≤31)[7].

*Medical history*

Data about the presence of any chronic diseases, and the presence of upper and lower GI symptoms were also collected. The GI symptoms were assessed using a well-established questionnaire, the GIT Symptom Rating Scale (GSRS)[20]. All the sections of the questionnaire were translated to the Arabic language from the original English version by using back-to-back-translation method. A pilot study was conducted on 25 physicians using the translated Arabic questionnaire to ascertain clarity, reliability, and the time required to complete it. Participants who participated in the pilot study were excluded from the main study, and according to the results obtained the structure of the questionnaire was reformatted to facilitate data collection.

**Ethical considerations**

The study was approved by the Faculty of Medicine research ethics committee, Suez Canal University (code #4251, Date: 28/7/2020). Informed consent was obtained from all study participants before

they participated in the study. The procedures applied in our study adhere to the tenets of the Declaration of Helsinki.

## Statistical analysis

Statistical analysis was performed using SPSS version 22. Quantitative variables were expressed as mean ± SD, median (interquartile interval), whereas categorical variables were displayed as frequencies. Univariate analysis was performed using the Chi-square test or Fisher's Exact Test for qualitative data. Spearman's rho correlation was used to evaluate the correlation between MBI scales and GIT symptoms. Multivariate analysis was conducted in form of ordinal regression of major GIT symptoms during the past week about MBI domains presence. Results were considered statistically significant if $p<0.05$.

## Results

*Participants' characteristics*

Descriptive statistics of studied participants are demonstrated in Table 1. It shows that 63% were married, and 59% were females. 41.3% of the participant are surgical staff. The current smokers were few in the study (7.2%) while 18% had chronic diseases. Regarding burnout subscales, 75% had emotional exhaustion, 53.9% had depersonalization, and 52.1% had reduced professional accomplishment. While 56.3% of studied physicians had burnout.

*GIT symptoms among participants*

Table 2 displays GIT symptoms among participants. Regarding upper GIT symptoms, 21.6% of studied physicians had moderate pain or discomfort in their upper abdomen or the pit of their stomach, 13.2% had moderately severe heartburn, 9.6% had severe acid reflux. Also, 25.7 % suffered from hunger pains in the stomach, 6.6% had moderately severe nausea as well as rumbling in the stomach. While 11.4% had severe bloating and 16.2% had moderate burping. Regarding lower GIT symptoms, 22.2% had moderate passing gas or flatus, each of passing gas or flatus, constipation, or diarrhea are reported as very severe among 3.6 %of participants. About fourteen percent reported moderate passing of loose stool, and 12% suffered from moderate passing of hard stool, and the same for moderate urgent need to have a bowel movement. 10.2% of participants reported going to the toilet because of the sensation of not completely emptying the bowels moderately. Table 3 displays the MBI domains as risk factors of upper GIT symptoms. For pain or discomfort in the upper abdomen or the pit of the stomach, the significant risk factor was depersonalization. Heartburn, it was affected by reduced personal accomplishment. For hunger pains in the stomach, the risk factors were both depersonalization and reduced personal accomplishment. While for nausea, the risk factors were emotional exhaustion and depersonalization. Rumbling in the stomach is affected by emotional exhaustion and burnout. Also, bloating is affected by emotional exhaustion, depersonalization, and burnout. In addition, burping is affected by depersonalization and burnout.

*Univariate Analysis of Risk Factors*

Regarding lower GIT symptoms, Table 4 shows that emotional exhaustion was a significant risk factor of the urgent need to have a bowel movement, as 88.9% of participants suffered from very severe discomfort had emotional exhaustion.

*Correlation between GIT Symptoms and burnout subscale*

Table 5 illustrates the correlation between MBI scales and GIT symptoms. Most of GIT symptoms had significant weak positive.

| Table 1: Description of the studied physicians (n=167) | | |
|---|---|---|
| **Variables** | **Frequency** | % |
| **Marital status** (Single) | 61 | 36.5 |
| Married | 105 | 62.9 |
| Widow | 1 | 0.6 |
| **Gender** (Male) | 68 | 40.7 |
| Female | 99 | 59.3 |
| **Job** | | |
| Medical staff | 98 | 58.7 |
| Surgical staff | 69 | 41.3 |
| **Smoking status** | | |
| Non-smoker | 152 | 91.0 |
| Current smoker | 12 | 7.2 |
| Ex-smoker | 3 | 1.8 |
| **Having a chronic disease** (Yes) | 30 | 18 |
| **Emotional exhaustion presence** (No.) | 42 | 25.1 |
| Yes | 125 | 74.9 |
| Score (Mean ± SD) | 37.41 ± 11.61 | |
| Median, IQR | 36, 17 | |
| **Depersonalization presence** (no.) | 77 | 46.1 |
| Yes | 90 | 53.9 |
| Score (Mean ± SD) | 13.06 ± 7.87 | |
| Median, IQR | 13, 12 | |
| **Reduced professional accomplishment presence** (No.) | 80 | 47.9 |
| Yes | 87 | 52.1 |
| Score (Mean ± SD) | 30.82 ± 8.98 | |
| Median, IQR | 31, 13 | |
| **Burnout presence** (No.) | 73 | 43.7 |
| Yes | 94 | 56.3 |
| Score (Mean ± SD) | 78.29 ± 17.89 | |
| Median, IQR | 79, 23 | |

*IQR: Interquartile range*

correlations with emotional exhaustion, depersonalization, and total burnout scales. For instances, pain or discomfort in upper abdomen or the pit of stomach is positively significantly correlated with EE (r= 0.263, *p*=0.001), DP (r= 0.293, *p*=0.000), and burnout (r= 0.290, *p*=0.000), heartburn is positively significantly correlated the same scales EE r= 0.227, *p*= 0.003, DP r= 0.219, *p*= 0.005, burnout r= 0.243, *p*= 0.002, respectively, acid reflux is also positively significantly correlated with EE r= 0.184, *p*= 0.018, r= 0.158, *p*= 0.042, r= 0.177, *p*= 0.022, respectively. Hunger pains in the stomach shows significant correlation with EE (r= 0.164, *p*= 0.034), DP (r= 0.238, *p*= 0.002), total burnout (r= 0.158, *p*= 0.042) respectively, nausea also shows statistically significant results with EE (r= 0.304, *p*= 0.000), DP (r= 0.311, *p*= 0.000), total burnout (r= 0.305, *p*= 0.000), respectively. Also, rumbling in the stomach, bloating, burping, passing gas or flatus, diarrhea, and hard stool had positive week significant correlation with the same 3 scales. While, three symptoms, had positive significant correlation with EE and

burnout scales only as follow; constipation is significantly correlated with EE ($p$= 0.02), and total burnout ($p$= 0.016), urgent need to have a bowel movement is also correlated with EE and total burnout ($p$= 0.000, $p$= 0.000, respectively), and going to the toilet because of sensation of not completely emptying the bowels also showed significant results with EE and total burnout ($p$= 0.003, $p$= 0.004, respectively). Unfortunately, no GIT symptoms were correlated to professional accomplishment scale. While all GIT symptoms had at positive weak significant correlation with least two scales except loose stool which did not show any significant correlation.

**Table 2: GIT symptoms of the studied physicians during the past week (n=167).**

| Bothering GI symptoms | No at all | | Minor | | Mild | | Moderate | | Moderately severe | | Severe | | Very Severe | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Pain/discomfort in the upper abdomen or pit of stomach | 54 | 32.3 | 15 | 9.0 | 20 | 12.0 | 36 | 21.6 | 15 | 9.0 | 15 | 9.0 | 12 | 7.2 |
| Heartburn | 43 | 25.7 | 20 | 12.0 | 27 | 16.2 | 31 | 18.6 | 18 | 10.8 | 22 | 13.2 | 6 | 3.6 |
| Acid reflux | 58 | 34.7 | 20 | 12.0 | 28 | 16.8 | 18 | 10.8 | 22 | 13.2 | 16 | 9.6 | 5 | 3.0 |
| Hunger pains in the stomach | 49 | 29.3 | 21 | 12.6 | 25 | 15.0 | 43 | 25.7 | 12 | 7.2 | 9 | 5.4 | 8 | 4.8 |
| Nausea | 68 | 40.7 | 34 | 20.4 | 25 | 15.0 | 17 | 10.2 | 11 | 6.6 | 4 | 2.4 | 8 | 4.8 |
| Stomach Rumbling | 53 | 31.7 | 41 | 24.6 | 33 | 19.8 | 20 | 12.0 | 11 | 6.6 | 4 | 2.4 | 5 | 3.0 |
| Bloating | 37 | 22.2 | 21 | 12.6 | 40 | 24.0 | 27 | 16.2 | 17 | 10.2 | 19 | 11.4 | 6 | 3.6 |
| Burping | 70 | 41.9 | 33 | 19.8 | 30 | 18.0 | 17 | 10.2 | 8 | 4.8 | 5 | 3.0 | 4 | 2.4 |
| Passing gas/ flatus | 44 | 26.3 | 32 | 19.2 | 25 | 15.0 | 37 | 22.2 | 13 | 7.8 | 10 | 6.0 | 6 | 3.6 |
| Constipation | 63 | 37.7 | 35 | 21.0 | 26 | 15.6 | 19 | 11.4 | 14 | 8.4 | 4 | 2.4 | 6 | 3.6 |
| Diarrhea | 81 | 48.5 | 18 | 10.8 | 29 | 17.4 | 19 | 11.4 | 12 | 7.2 | 2 | 1.2 | 6 | 3.6 |
| Loose stools | 73 | 43.7 | 41 | 24.6 | 15 | 9.0 | 23 | 13.8 | 6 | 3.6 | 4 | 2.4 | 5 | 3.0 |
| Hard stools | 79 | 47.3 | 28 | 16.8 | 24 | 14.4 | 20 | 12.0 | 7 | 4.2 | 4 | 2.4 | 5 | 3.0 |
| Urgent need to have a bowel movement | 70 | 41.9 | 29 | 17.4 | 21 | 12.6 | 20 | 12.0 | 12 | 7.2 | 6 | 3.6 | 9 | 5.4 |
| Going to the toilet because of sensation of not completely emptying the bowels | 73 | 43.7 | 41 | 24.6 | 15 | 9.0 | 17 | 10.2 | 9 | 5.4 | 6 | 3.6 | 6 | 3.6 |

*Multivariate Analysis*

The ordinal regression of major GIT symptoms during the past week in relation to MBI domains presence is showed in Table 6. The presence of the MBI domains is the reference. Emotional exhaustion and depersonalization are predictors of pain or discomfort in upper abdomen ($p$-= 0.017, and $p$= 0.003, respectively) and nausea ($p$= 0.028, and $p$= 0.006, respectively). Emotional exhaustion is a significant predictor of heartburn, bloating, urgent need to have a bowel movement ($p$= 0.038, $p$= 0.020, and $p$= 0.000, respectively). Depersonalization is the predictor of hunger pains in the stomach (β= -1.069, $p$= 0.008).

**Table 3: Upper gastrointestinal symptoms during the past week and MBI domains of burnout (n=167).**

| Burnout dimensions | No at all discomfort | | Minor discomfort | | Mild discomfort | | Moderate discomfort | | Moderate severe Discomfort | | Severe discomfort | | V. severe discomfort | | *p-value* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | |
| **Pain or discomfort in the upper abdomen or the pit of the stomach** | | | | | | | | | | | | | | | |
| *EE* | 37 | 68.5 | 9 | 60 | 12 | 60 | 29 | 80.6 | 13 | 86.7 | 13 | 86.7 | 12 | 100 | 0.052a |
| *DP* | 20 | 37.0 | 9 | 60.0 | 8 | 40.0 | 24 | 66.7 | 11 | 73.3 | 9 | 60.0 | 9 | 75.0 | 0.020* |
| *PA* | 25 | 46.3 | 8 | 53.3 | 11 | 55.0 | 20 | 55.6 | 11 | 73.3 | 7 | 46.7 | 5 | 41.7 | 0.624 |
| *Burn-out* | 28 | 48.1 | 8 | 53.3 | 8 | 40.0 | 23 | 63.9 | 11 | 73.3 | 9 | 60.0 | 9 | 75.0 | 0.233 |
| **Heartburn** | | | | | | | | | | | | | | | |
| *EE* | 27 | 62.8 | 13 | 65.0 | 20 | 74.1 | 25 | 80.6 | 17 | 94.4 | 17 | 77.3 | 6 | 100 | 0.099 |
| *DP* | 17 | 39.5 | 16 | 80.0 | 12 | 44.4 | 14 | 45.2 | 11 | 61.1 | 12 | 54.5 | 5 | 83.3 | 0.092 |
| *PA* | 15 | 34.9 | 14 | 70.0 | 11 | 40.7 | 11 | 35.5 | 10 | 55.6 | 10 | 45.5 | 5 | 83.3 | 0.040* |
| *Burn-out* | 17 | 39.5 | 10 | 50.0 | 18 | 66.7 | 20 | 64.5 | 11 | 61.1 | 12 | 54.5 | 6 | 100 | 0.059 |
| **Acid reflux** | | | | | | | | | | | | | | | |
| *EE* | 39 | 67.2 | 15 | 75.0 | 19 | 67.9 | 15 | 83.3 | 18 | 81.8 | 14 | 87.5 | 5 | 100 | 0.424a |
| *DP* | 27 | 46.6 | 8 | 40.0 | 15 | 53.6 | 11 | 61.1 | 14 | 63.6 | 11 | 68.8 | 4 | 80.0 | 0.337 |
| *PA* | 27 | 46.6 | 9 | 45.0 | 14 | 50.0 | 10 | 55.6 | 16 | 72.7 | 9 | 56.2 | 2 | 40.0 | 0.492 |
| *Burn-out* | 26 | 44.8 | 12 | 60.0 | 16 | 57.1 | 11 | 61.1 | 14 | 63.6 | 11 | 68.8 | 4 | 80.0 | 0.421 |
| **Hunger pains in the stomach** | | | | | | | | | | | | | | | |
| *EE* | 35 | 71.4 | 14 | 66.7 | 19 | 76.0 | 32 | 74.4 | 10 | 83.3 | 7 | 77.8 | 8 | 100 | 0.641 |
| *DP* | 27 | 55.1 | 8 | 38.1 | 6 | 24.0 | 24 | 55.8 | 9 | 75.0 | 6 | 66.7 | 7 | 87.5 | 0.021*a |
| *PA* | 23 | 46.9 | 8 | 38.1 | 6 | 24.0 | 23 | 53.5 | 8 | 66.7 | 5 | 55.6 | 3 | 37.5 | 0.008*a |
| *Burn-out* | 28 | 57.1 | 7 | 33.3 | 14 | 56.0 | 23 | 53.5 | 8 | 66.7 | 7 | 77.8 | 7 | 87.5 | 0.134 |
| **Nausea** | | | | | | | | | | | | | | | |
| *EE* | 47 | 69.1 | 22 | 64.7 | 22 | 88.0 | 11 | 64.7 | 11 | 100 | 4 | 100 | 8 | 100 | 0.026*a |
| *DP* | 27 | 39.7 | 19 | 55.9 | 18 | 72.0 | 10 | 58.8 | 6 | 54.5 | 3 | 75.0 | 7 | 87.5 | 0.033*a |
| *PA* | 32 | 47.1 | 19 | 55.9 | 13 | 52.0 | 11 | 64.7 | 5 | 45.5 | 2 | 50.0 | 5 | 62.5 | 0.870 |
| *Burn-out* | 33 | 48.5 | 30 | 88.2 | 23 | 92.0 | 15 | 88.2 | 11 | 100 | 4 | 100 | 8 | 100 | 0.093a |
| **Rumbling in stomach** | | | | | | | | | | | | | | | |
| *EE* | 32 | 60.4 | 31 | 75.6 | 27 | 81.8 | 15 | 75.0 | 11 | 100 | 4 | 100 | 5 | 100 | 0.045*a |
| *DP* | 23 | 43.4 | 22 | 53.7 | 18 | 54.5 | 12 | 60.0 | 8 | 72.7 | 3 | 75.0 | 4 | 80.0 | 0.427a |
| *PA* | 26 | 49.1 | 17 | 41.5 | 18 | 54.5 | 16 | 80.0 | 5 | 45.5 | 1 | 25.0 | 4 | 80.0 | 0.070a |
| *Burn-out* | 21 | 39.6 | 24 | 58.5 | 20 | 60.6 | 12 | 60.0 | 9 | 81.8 | 3 | 75.0 | 5 | 100 | 0.029*a |
| **Bloating** | | | | | | | | | | | | | | | |
| *EE* | 21 | 56.8 | 15 | 71.4 | 29 | 72.5 | 19 | 70.4 | 16 | 94.1 | 19 | 100 | 6 | 100 | 0.002*a |
| *DP* | 11 | 29.7 | 11 | 52.4 | 27 | 67.5 | 15 | 55.6 | 7 | 41.2 | 15 | 78.9 | 4 | 66.7 | 0.006* |
| *PA* | 17 | 45.9 | 10 | 47.6 | 23 | 57.5 | 18 | 66.7 | 7 | 41.2 | 8 | 42.1 | 4 | 66.7 | 0.472 |
| *Burn-out* | 12 | 32.4 | 12 | 57.1 | 24 | 60.0 | 16 | 59.3 | 10 | 58.8 | 15 | 78.9 | 5 | 83.3 | 0.020* |
| **Burping** | | | | | | | | | | | | | | | |
| *EE* | 49 | 70 | 21 | 63.6 | 25 | 83.3 | 14 | 82.4 | 7 | 87.5 | 5 | 100 | 4 | 100 | 0.302a |
| *DP* | 31 | 44.3 | 16 | 48.5 | 19 | 63.3 | 13 | 76.5 | 3 | 37.5 | 5 | 100 | 3 | 75.0 | 0.031*a |
| *PA* | 34 | 48.5 | 22 | 66.7 | 14 | 46.7 | 6 | 35.3 | 3 | 37.5 | 4 | 50.0 | 3 | 75.0 | 0.260a |
| *Burn-out* | 31 | 44.3 | 18 | 54.5 | 19 | 63.3 | 13 | 76.5 | 4 | 50.0 | 5 | 100 | 4 | 100 | 0.020*a |

*EE: emotional exhaustion, DP: personalization, PA: professional accomplishment, a Fisher's Exact Test, *p<0.05.*

| Table 4: Lower gastrointestinal symptoms and dimensions of burnout (n=167). | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Burnout dimensions | No at all discomfort | | Minor discomfort | | Mild discomfort | | Moderate discomfort | | Moderate severe discomfort | | Severe discomfort | | V. severe discomfort | | P |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | |
| **Passing gas or flatus** | | | | | | | | | | | | | | | |
| *EE* | 29 | 65.9 | 23 | 71.9 | 17 | 68.0 | 30 | 81.1 | 11 | 84.6 | 9 | 90.0 | 6 | 100 | 0.365a |
| *DP* | 20 | 45.5 | 17 | 53.1 | 11 | 44.0 | 22 | 59.5 | 6 | 46.2 | 8 | 80.0 | 6 | 100 | 0.087 |
| *PA* | 24 | 54.5 | 14 | 43.8 | 10 | 48.0 | 21 | 56.8 | 5 | 38.5 | 6 | 60.0 | 5 | 83.3 | 0.537 |
| *Burnout* | 22 | 50.0 | 15 | 46.9 | 13 | 52.0 | 23 | 62.2 | 8 | 61.5 | 7 | 70.0 | 6 | 100 | 0.228 |
| **Constipation** | | | | | | | | | | | | | | | |
| *EE* | 45 | 71.4 | 21 | 60.0 | 23 | 88.5 | 15 | 78.9 | 11 | 78.6 | 4 | 100 | 6 | 100 | 0.130a |
| *DP* | 30 | 47.6 | 20 | 57.1 | 15 | 57.7 | 8 | 42.1 | 7 | 50.0 | 4 | 100 | 6 | 100 | 0.084a |
| *PA* | 34 | 54.0 | 20 | 57.1 | 13 | 50.0 | 7 | 36.8 | 7 | 50.0 | 3 | 75.0 | 3 | 50.0 | 0.805a |
| *Burnout* | 34 | 54.0 | 18 | 51.4 | 16 | 61.5 | 9 | 47.4 | 7 | 50.0 | 4 | 100 | 6 | 100 | 0.154a |
| **Diarrhea** | | | | | | | | | | | | | | | |
| *EE* | 56 | 69.1 | 13 | 72.2 | 20 | 69.0 | 17 | 89.5 | 11 | 91.7 | 2 | 100 | 6 | 100 | 0.239a |
| *DP* | 39 | 48.1 | 8 | 44.4 | 17 | 58.6 | 10 | 52.6 | 8 | 66.7 | 2 | 100 | 6 | 100 | 0.137a |
| *PA* | 44 | 54.3 | 6 | 33.3 | 15 | 51.7 | 11 | 57.9 | 6 | 50.0 | 1 | 50.0 | 24 | 66.7 | 0.743a |
| *Burnout* | 43 | 53.1 | 10 | 55.6 | 14 | 48.3 | 12 | 63.2 | 7 | 58.3 | 2 | 100 | 6 | 100 | 0.268a |
| **Loose stools** | | | | | | | | | | | | | | | |
| *EE* | 53 | 72.6 | 25 | 61.0 | 13 | 86.7 | 21 | 91.3 | 4 | 66.7 | 4 | 100 | 5 | 100 | 0.067a |
| *DP* | 34 | 46.6 | 22 | 53.7 | 9 | 60.0 | 12 | 52.2 | 5 | 83.3 | 3 | 75.0 | 5 | 100 | 0.189a |
| *PA* | 38 | 52.2 | 21 | 51.2 | 7 | 46.7 | 11 | 47.8 | 5 | 83.3 | 1 | 25.0 | 2 | 40.0 | 0.541a |
| *Burnout* | 43 | 58.9 | 17 | 41.5 | 10 | 66.7 | 13 | 56.5 | 3 | 50.0 | 3 | 75.0 | 5 | 100 | 0.169a |
| **Hard stools** | | | | | | | | | | | | | | | |
| *EE* | 51 | 64.6 | 24 | 85.7 | 18 | 75.0 | 17 | 85.0 | 6 | 85.7 | 4 | 100 | 5 | 100 | 0.142a |
| *DP* | 38 | 48.1 | 15 | 53.6 | 12 | 50.0 | 12 | 60.0 | 5 | 71.4 | 3 | 75.0 | 5 | 100 | 0.305a |
| *PA* | 42 | 53.2 | 15 | 53.6 | 12 | 50.0 | 7 | 35.0 | 6 | 85.7 | 3 | 75.0 | 2 | 40.0 | 0.363a |
| *Burnout* | 39 | 49.4 | 19 | 67.9 | 11 | 45.8 | 12 | 60.0 | 5 | 71.4 | 3 | 75.0 | 5 | 100 | 0.160a |
| **Urgent need to have a bowel movement** | | | | | | | | | | | | | | | |
| *EE* | 41 | 58.6 | 23 | 79.3 | 18 | 85.7 | 18 | 90.0 | 11 | 91.7 | 6 | 100 | 8 | 88.9 | 0.008*a |
| *DP* | 36 | 51.4 | 13 | 44.8 | 12 | 57.1 | 12 | 60.0 | 7 | 58.3 | 2 | 33.3 | 8 | 88.9 | 0.313a |
| *PA* | 38 | 54.3 | 14 | 48.3 | 9 | 42.9 | 12 | 60.0 | 8 | 66.7 | 1 | 16.7 | 5 | 55.6 | 0.495a |
| *Burnout* | 33 | 47.1 | 17 | 58.6 | 14 | 66.7 | 14 | 70.0 | 7 | 58.3 | 2 | 33.3 | 7 | 77.8 | 0.247 |
| **Going to the toilet because of the sensation of not completely emptying the bowels** | | | | | | | | | | | | | | | |
| *EE* | 50 | 68.5 | 28 | 68.3 | 13 | 86.7 | 14 | 82.4 | 8 | 88.9 | 6 | 100 | 6 | 100 | 0.244a |
| *DP* | 35 | 47.9 | 25 | 61.0 | 7 | 46.7 | 9 | 52.9 | 3 | 33.3 | 5 | 83.3 | 6 | 100 | 0.086 |
| *PA* | 37 | 50.7 | 23 | 56.1 | 4 | 26.7 | 12 | 70.6 | 3 | 33.3 | 5 | 83.3 | 3 | 50.0 | 0.121a |
| *Burnout* | 39 | 53.4 | 21 | 51.2 | 9 | 60.0 | 11 | 64.7 | 3 | 33.3 | 5 | 83.3 | 6 | 100 | 0.143a |

*EE: emotional exhaustion, DP: personalization, PA: professional accomplishment, a Fisher's Exact Test, *p<0.05*

## Discussion

This study was conducted to assess burnout and its relationship with GI symptoms among Egyptian physicians during the COVID-19 pandemic. To our knowledge, it is the first nation-wide study to evaluate the relation between burnout and symptoms of functional GI disorders in Egypt. In this study, the prevalence of emotional

exhaustion, depersonalization, reduced professional accomplishment, and burnout amongst physicians were 74.9%, 53.9%, 52.1%, and 56.3%, respectively. These high prevalence rates can be related to the high level of stress and challenges that physicians are facing daily in their work, especially during the COVID-19 pandemic.

**Table 5: Spearman's rho Correlation Matrix of Gastrointestinal Symptoms and MBI subscale and total burnout scale (n=167)**

| Gastrointestinal symptoms | Emotional exhaustion | | Depersonalization | | Professional accomplishment | | Total burnout | |
|---|---|---|---|---|---|---|---|---|
| | r | *p* | r | *p* | r | *P* | r | *p* |
| Pain or discomfort in your upper abdomen or the pit of your stomach | 0.263 | 0.001* | 0.293 | 0.000* | -0.038 | 0.628 | 0.290 | 0.000* |
| Heartburn | 0.227 | 0.003* | 0.219 | 0.005* | -0.026 | 0.737 | 0.243 | 0.002* |
| Acid reflux | 0.184 | 0.018* | 0.158 | 0.042* | -0.003 | 0.971 | 0.177 | 0.022* |
| Hunger pains in the stomach | 0.164 | 0.034* | 0.238 | 0.002* | -0.117 | 0.134 | 0.158 | 0.042* |
| Nausea | 0.304 | 0.000* | 0.311 | 0.000* | -0.109 | 0.159 | 0.305 | 0.000* |
| Rumbling in your stomach | 0.216 | 0.005* | 0.167 | 0.031* | -0.098 | 0.206 | 0.183 | 0.018* |
| Bloating | 0.321 | 0.000* | 0.245 | 0.001* | -0.041 | 0.602 | 0.294 | 0.000* |
| Burping | 0.223 | 0.004* | 0.284 | 0.000* | -0.023 | 0.766 | 0.257 | 0.001* |
| Passing gas or flatus | 0.233 | 0.002* | 0.247 | 0.001* | -0.038 | 0.625 | 0.241 | 0.002* |
| Constipation | 0.180 | 0.020* | 0.089 | 0.254 | 0.073 | 0.346 | 0.185 | 0.016* |
| Diarrhea | 0.197 | 0.011* | 0.172 | 0.026* | -0.027 | 0.733 | 0.186 | 0.016* |
| Loose stools | 0.111 | 0.152 | 0.147 | 0.057 | -0.001 | 0.995 | 0.139 | 0.072 |
| Hard stools | 0.237 | 0.002* | 0.179 | 0.021* | -0.001 | 0.993 | 0.226 | 0.003* |
| Urgent need to have a bowel movement | 0.354 | 0.000* | 0.139 | 0.073 | 0.035 | 0.655 | 0.317 | 0.000* |
| Going to the toilet because of sensation of not completely emptying the bowels | 0.226 | 0.003* | 0.150 | 0.053 | 0.007 | 0.924 | 0.222 | 0.004* |

Similarly, an Egyptian study of physicians found a high prevalence of high burnout (72.8%), emotional exhaustion (62.2%) and depersonalization (62.4%), and low personal accomplishment (43.5 %)[15]. On the other hand, reported lower prevalence of burnout (36.36%) among Egyptian physicians during the COVID-19 pandemic[13]. The use of different methodologies and different cutoff point and classification of burnout in these studies results in different estimates even when the same scale is used. In the present study, the relationship between each burnout dimension and upper GIT symptoms indicating medical diseases as gastroesophageal reflux (GERD) and the gastric ulcer was evaluated. In bivariate analyses, emotional exhaustion, depersonalization, and burnout were significantly associated with pain or discomfort in the upper abdomen, heartburn, acid reflux, hunger pain in the stomach, nausea, and rumbling in the stomach. In subsequent ordinal regression analysis, emotional exhaustion was a significant predictor of pain or discomfort in the upper abdomen, heartburn, and nausea. While depersonalization was a predictor of pain or discomfort in the upper abdomen, hunger pains in the stomach, and nausea.

This result adheres to the finding of Cholongitas and Pipili who showed that burnout syndrome is associated with ulcer-like pain and dyspepsia[17]. Moreover, emotional exhaustion is associated with nausea, heartburn, and regurgitation..

**Table 6: Ordinal regression analysis of MBI domains presence and GIT symptoms during the past week (n=167)**

| Dependent variable | Independent variable | β | *p-value* | 95% Confidence Interval | |
|---|---|---|---|---|---|
| **Pain or discomfort in the upper abdomen** | EE (Yes = Ref) | -1.173 | 0.017* | -2.134 | -0.213 |
| | DP (Yes = Ref) | -1.205 | 0.003* | -1.999 | -0.411 |
| | PA (Yes = Ref) | -0.190 | 0.558 | -0.824 | 0.445 |
| | Burnout (Yes = Ref) | 0.963 | 0.083 | -0.122 | 2.048 |
| **Heartburn** | EE (Yes = Ref) | -0.994 | 0.038* | -1.933 | -0.055 |
| | DP (Yes = Ref) | -0.432 | 0.267 | -1.196 | 0.332 |
| | PA (Yes = Ref) | -0.393 | 0.219 | -1.020 | 0.234 |
| | Burnout (Yes = Ref) | 0.326 | 0.547 | -0.736 | 1.389 |
| **Hunger pains in the stomach** | EE (Yes = Ref) | -0.794 | 0.099 | -1.738 | 0.150 |
| | DP (Yes = Ref) | -1.069 | 0.008* | -1.853 | -0.285 |
| | PA (Yes = Ref) | -0.586 | 0.071 | -1.221 | 0.049 |
| | Burnout (Yes = Ref) | 0.955 | 0.083 | -0.126 | 2.035 |
| **Nausea** | EE (Yes = Ref) | -1.114 | 0.028* | -2.111 | -0.118 |
| | DP (Yes = Ref) | -1.152 | 0.006* | -1.965 | -0.338 |
| | PA (Yes = Ref) | -0.335 | 0.312 | -0.986 | 0.315 |
| | Burnout (Yes = Ref) | 0.935 | 0.099 | -0.177 | 2.047 |
| **Stomach Rumbling** | EE (Yes = Ref) | -0.879 | 0.073 | -1.841 | 0.083 |
| | DP (Yes = Ref) | -0.132 | 0.740 | -0.908 | 0.645 |
| | PA (Yes = Ref) | -0.333 | 0.306 | -0.972 | 0.305 |
| | Burnout (Yes = Ref) | -0.246 | 0.656 | -1.330 | 0.837 |
| **Bloating** | EE (Yes = Ref) | -1.117 | 0.020* | -2.058 | -0.176 |
| | DP (Yes = Ref) | -0.523 | 0.182 | -1.290 | 0.244 |
| | PA (Yes = Ref) | -0.051 | 0.872 | -0.677 | 0.574 |
| | Burnout (Yes = Ref) | 0.086 | 0.874 | -0.977 | 1.1149 |
| **Burping** | EE (Yes = Ref) | 0.158 | 0.752 | -0.822 | 1.138 |
| | DP (Yes = Ref) | -0.213 | 0.597 | -1.004 | 0.577 |
| | PA (Yes = Ref) | 0.307 | 0.347 | -0.333 | 0.946 |
| | Burnout (Yes = Ref) | -0.986 | 0.084 | -2.105 | 0.133 |
| Urgent need to have a bowel movement | EE (Yes = Ref) | -2.031 | 0.000* | -3.065 | -0.997 |
| | DP (Yes = Ref) | -0.261 | 0.530 | -1.074 | 0.553 |
| | PA (Yes = Ref) | -0.205 | 0.547 | -0.870 | 0.461 |
| | Burnout (Yes = Ref) | 0.780 | 0.171 | -0.338 | 1.898 |

*EE: emotional exhaustion, DP: personalization, PA: professional accomplishment, *p<0.05*

Similarly, an interaction between burnout and peptic ulcer (high burnout increased the prevalence of peptic ulcers) was reported. Regarding lower GIT symptoms indicating medical diseases such as irritable bowel syndrome (IBS), bivariate analyses in the present work indicated that emotional exhaustion, depersonalization, and burnout significantly correlated with bloating, burping, passing gas, or flatus, constipation, diarrhea, and hard stools. Whereas only emotional exhaustion and burnout had a significant correlation with an urgent need to have a bowel movement and go to the toilet because of the sensation of not completely emptying the bowels. The multivariate analysis identified emotional exhaustion as a significant predictor of bloating and urgent need to have a bowel movement. This finding echoed that of a prior study of Cholongitas and Pipili which reported a relation between the burnout syndrome and lower GI symptoms[17]. The study also revealed that emotional

exhaustion is significantly related to passing hard stool and increased bowel gas. This agrees with Kasemy and his coworkers who demonstrated a significant relationship between psychological conditions and occurrence of irritable bowel disease (IBS) highlighting that the studied health care workers having depression or emotional stress were two and three times, respectively more prone to show IBS[22]. So, these findings suggest and support the existence of a bidirectional link between psychological stress and the resulting burnout on one hand and the functional GIT disorders on the other hand. This may be explained in the way that psychological stress and subsequently burnout affect some physiological functions in the gastrointestinal system involving gut motility, gastric secretion, visceral sensitivity, mucosal permeability, and mucosal blood flow[23].

### Study limitations

This study is firstly limited by its cross-sectional nature which makes it hard to establish a causality relationship between burnout and GIT symptoms. So, we encourage performing longitudinal studies to establish this temporal relationship and causality. Secondly, the study tool includes self-report of medical illnesses and symptoms, but we have confidence in the awareness of studied physicians with symptoms and their medical conditions.

## Conclusion

Burnout was highly prevalent among studied physicians. The emotional exhaustion predicted ulcers like pain in the upper abdomen, heartburn, nausea, bloating, and urgent need to have a bowel movement. Whereas depersonalization significantly predicted ulcer-like pain or discomfort in the upper abdomen and nausea. Lastly, a significant weak correlation was detected between burnout and most of the upper and lower functional GIT symptoms. Subsequently, our results argue for more emphasis on a comprehensive evaluation of the emotional stress, burnout, and their related physical health effects among health care workers and specifically the physicians. Additionally, it would be valuable to establish an effective counseling system, as well as a stress and burnout management program to enhance the coping skills of physicians and help them to control burnout and consequently the associated GIT alterations.

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## Authors' Contributions

All Authors equally contributed to the design and implementation of the research. Also, all authors equally participated in performing the analysis and interpretation of the data as well as the writing of the manuscript. All authors read and reviewed the manuscript and approved it for submission. All authors are accountable for all aspects of the work and ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.