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Prevalence of Gastrointestinal Disorders and Their Association With Stress and Sedentary Lifestyle in Working Professionals

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ABSTRACT

Background: Gastrointestinal (GI) disorders represent a significant health burden among working adults, yet the combined impact of occupational stress and sedentary behavior on symptom prevalence remains underexplored.

Objectives: To determine the prevalence of GI disorders and to examine their associations with perceived stress and sedentary lifestyle in a cohort of working professionals in Saudi Arabia.

Methods: In this descriptive, cross-sectional study, 650 working professionals aged 20–60 years were recruited at King Fahad Hospital, Al-Ahsa. Participants completed the Gastrointestinal Symptom Rating Scale (GSRS), the 10-item Perceived Stress Scale (PSS-10), and the Sedentary Behavior Questionnaire (SBQ). Descriptive statistics summarized sociodemographic data and scale scores. Pearson's correlation coefficients assessed bivariate associations among GSRS, PSS-10, and total sedentary time. Multiple linear regression models adjusted for age, gender, smoking status, and physical activity to identify independent predictors of overall GSRS score. Statistical significance was set at $p < 0.05$.

Results: The mean total GSRS score was 15.5 ± 6.2, with 28% of participants reporting moderate-to-severe abdominal pain and 31% reporting moderate indigestion. The mean PSS-10 score was 21.7 ± 6.1, and average daily sedentary time was 8.9 ± 2.3 hours. Perceived stress correlated strongly with total GSRS score ($r = 0.52$, $p < 0.001$), while sedentary time showed a moderate correlation ($r = 0.25$, $p < 0.001$). In multivariate analysis, both PSS-10 score ($\beta = 0.19$, 95% CI: 0.13–0.27; $p < 0.001$) and sedentary time ($\beta = 0.23$, 95% CI: 0.09–0.37; $p = 0.001$) were independent predictors of GI symptom severity, accounting for 37% of the variance in GSRS scores.

Conclusions: GI disorders are highly prevalent among working professionals and are significantly associated with occupational stress and sedentary lifestyle. Workplace interventions targeting stress reduction and reduced sitting time may mitigate GI symptom burden in this population.

Keywords: gastrointestinal disorders; stress; sedentary lifestyle; working professionals; cross-sectional study

1. INTRODUCTION

Gastrointestinal (GI) disorders represent a significant global health concern, with a substantial burden on healthcare systems and individuals' quality of life. These disorders encompass a wide range of conditions affecting the digestive tract, including functional gastrointestinal disorders (FGIDs) such as irritable bowel syndrome (IBS), gastroesophageal reflux disease (GERD), peptic ulcer disease, and constipation, among others [1]. The prevalence of GI disorders has shown a marked increase over recent decades, particularly in industrialized and urbanizing societies, where shifts in lifestyle, work-related stress, and dietary habits have been implicated as key contributing factors [2,3]. Understanding the epidemiology of these conditions in occupational settings is critical, as working professionals constitute a large and economically productive segment of the population that is increasingly exposed to high levels of psychosocial stress and sedentary behaviors [4].

Functional gastrointestinal disorders, particularly IBS and dyspepsia, have been shown to affect approximately 10–20% of the adult population worldwide, with considerable variation depending on diagnostic criteria and population characteristics [5]. These conditions are often chronic, relapsing, and difficult to manage, posing significant challenges for affected individuals

and healthcare providers alike. Evidence suggests that working individuals, especially those in high-demand professions such as healthcare, finance, education, and information technology, are particularly vulnerable to GI dysfunction due to the unique stressors associated with long working hours, high performance expectations, and limited opportunities for physical activity [6,7]. In many occupational contexts, sustained exposure to stress and a sedentary lifestyle have emerged as key modifiable risk factors that warrant closer scientific scrutiny.

Stress has long been recognized as a major contributor to gastrointestinal symptomatology, with mounting evidence linking psychosocial stress to both the onset and exacerbation of GI disorders [8]. The brain-gut axis—a complex bidirectional communication network involving the central and enteric nervous systems—plays a pivotal role in mediating this relationship. Stress can disrupt gastrointestinal motility, secretion, mucosal permeability, and microbial composition, all of which contribute to the development and persistence of symptoms such as bloating, abdominal pain, and altered bowel habits [9]. In the workplace context, chronic stress stemming from job insecurity, workload pressures, and poor work-life balance can amplify these physiological responses, potentially leading to more severe or persistent gastrointestinal complaints [10].

Concurrently, sedentary behavior—characterized by prolonged sitting and low energy expenditure—has gained recognition as an independent health risk factor associated with a wide array of non-communicable diseases, including obesity, cardiovascular disease, type 2 diabetes, and mental health disorders [11–30]. Recent research has also highlighted its adverse effects on gastrointestinal health, with sedentary behavior being linked to slower colonic transit time, increased risk of constipation, and potential exacerbation of symptoms in individuals with existing GI conditions [31]. Among working professionals, occupational sitting time can account for a significant portion of total daily sedentary behavior, especially in desk-based jobs where movement is restricted throughout the workday [32]. This interplay between sedentary lifestyle and gastrointestinal dysfunction remains an underexplored area, particularly in relation to working adults who are subject to both high stress levels and limited physical activity.

Despite increasing recognition of these associations, there is a paucity of comprehensive epidemiological studies investigating the combined impact of occupational stress and sedentary behavior on the prevalence of GI disorders in working professionals. While individual studies have examined the role of stress or physical inactivity in isolation, few have adopted an integrated approach that considers the synergistic effects of these variables within the occupational environment [4]. Additionally, much of the existing literature has focused on Western or high-income settings, limiting the generalizability of findings to diverse cultural and socioeconomic contexts where work structures, health behaviors, and stress responses may differ significantly [33]. Given the rising prevalence of GI disorders and the increasing sedentary nature of modern workplaces, there is a pressing need to elucidate the patterns and correlates of GI symptoms among working populations.

This study aims to address this gap by examining the prevalence of gastrointestinal disorders and their association with perceived stress levels and sedentary lifestyle among working professionals. By focusing on this population, the study seeks to provide insights into the occupational determinants of GI health, inform targeted workplace wellness interventions, and contribute to the broader understanding of how modern work environments shape chronic disease risk. Such evidence is essential for developing integrative health promotion strategies that not only alleviate GI symptoms but also enhance the overall well-being and productivity of the workforce.

2. AIM OF THE STUDY

The aim of this study is to examine the prevalence of gastrointestinal (GI) disorders among working professionals and to investigate the association between these disorders and two key modifiable lifestyle factors: perceived stress levels and sedentary behavior. By identifying the extent to which stress and sedentary lifestyle contribute to the burden of GI symptoms in occupational populations, the study seeks to inform workplace health promotion strategies and guide future research on preventive interventions.

Research Questions

1. What is the prevalence of gastrointestinal disorders among working professionals?

2. Is there a significant association between perceived stress levels and the occurrence of gastrointestinal symptoms in this population?

3. Does a sedentary lifestyle correlate with an increased risk of gastrointestinal disorders among working professionals?

4. How do stress and sedentary behavior jointly influence the likelihood or severity of GI disorders in occupational settings?

3. METHODS

Study Design

This study employed a descriptive cross-sectional correlational design to examine the prevalence of gastrointestinal (GI)

disorders and their association with stress and sedentary lifestyle among working professionals. The cross-sectional design was selected to capture a snapshot of the relationships between the variables of interest in a large occupational population within a defined timeframe.

Setting

The study was conducted at King Fahad Hospital in Al-Ahsa, located in the Eastern Province of the Kingdom of Saudi Arabia. King Fahad Hospital is a major tertiary care center that serves a diverse population of patients from urban and semi-urban areas. The hospital hosts a wide range of outpatient clinics and diagnostic services and receives a high volume of working-age adults, making it an appropriate setting for investigating occupational health-related concerns, including GI disorders.

Sample and Sampling

The study included a convenience sample of 650 working professionals attending outpatient clinics at King Fahad Hospital between January and March 2025. Participants were eligible if they met the following inclusion criteria: (1) aged between 20 and 60 years, (2) currently employed in any sector (public or private), (3) able to read and write Arabic, and (4) willing to provide informed consent. Individuals were excluded if they had been previously diagnosed with severe psychiatric disorders, cognitive impairments, or chronic GI diseases requiring surgical intervention. The sample size was determined based on previous studies examining similar associations and using a power analysis to ensure adequate statistical power for detecting moderate correlations ($\alpha = 0.05$, power = 0.80).

Data Collection Tools

Data were collected using a self-administered structured questionnaire composed of four sections:

1. **Sociodemographic and Occupational Characteristics:** This section collected information on participants' age, gender, occupation, duration of employment, marital status, educational level, income, smoking status, and physical activity habits.

2. **Gastrointestinal Symptom Rating Scale (GSRS):** The GSRS is a standardized instrument developed by Svedlund et al. (1988) to assess the frequency and severity of gastrointestinal symptoms. It was designed to evaluate the presence of GI symptoms across five domains: abdominal pain, reflux, indigestion, diarrhea, and constipation. The tool comprises 15 items, each scored on a 7-point Likert scale ranging from 1 (no discomfort) to 7 (very severe discomfort), with higher scores indicating greater symptom burden. The GSRS has demonstrated high internal consistency (Cronbach's alpha ranging from 0.74 to 0.85) and construct validity in various populations. For this study, the GSRS was translated into Arabic following a standardized forward–backward translation process, and the translated version was validated by a panel of bilingual experts. A pilot test with 30 participants yielded a Cronbach's alpha of 0.87, indicating high reliability in the local context.

3. **Perceived Stress Scale (PSS-10):** The PSS-10, developed by Cohen, Kamarck, and Mermelstein (1983), was used to assess the perceived stress levels among participants over the past month. It contains 10 items scored on a 5-point Likert scale ranging from 0 (never) to 4 (very often), with a total score ranging from 0 to 40. Higher scores indicate greater perceived stress. The PSS-10 has been widely used across cultures and has demonstrated strong psychometric properties, including a Cronbach's alpha of 0.84. The Arabic version of the PSS-10, validated by Almadi et al. (2012), was used in this study. The translation maintained semantic equivalence with the original tool, and previous studies in Arabic-speaking populations have confirmed its reliability and factorial validity.

4. **Sedentary Behavior Questionnaire (SBQ):** The SBQ, originally developed by Rosenberg et al. (2010), assesses the amount of time individuals spend in sedentary activities during a typical weekday and weekend day. The tool includes nine items capturing various sedentary behaviors (e.g., watching TV, computer use, reading, driving), with responses recorded in hours and minutes. Total sedentary time is calculated by summing hours spent across all activities. The SBQ has been validated for use in adult populations and shows moderate-to-high test-retest reliability (intraclass correlation coefficients ranging from 0.70 to 0.90). The Arabic version of the SBQ was developed for this study through forward and backward translation and evaluated by a panel of public health and occupational health experts. Content validity was supported by a CVI of 0.92, and a pilot reliability assessment revealed an intraclass correlation coefficient of 0.85.

Data Collection Procedure

Participants were recruited from outpatient clinics during routine visits. After providing written informed consent, eligible individuals received the structured questionnaire, which they completed on-site under the supervision of trained research assistants. Assistance was provided for any clarification needed. Each questionnaire took approximately 15–20 minutes to complete. Completed forms were reviewed for completeness before data entry. A unique identifier code was assigned to each respondent to ensure anonymity.

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Data Analysis

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to summarize participants' sociodemographic characteristics and scores on the GSRS, PSS-10, and SBQ. Pearson correlation coefficients were computed to examine the relationships between GI symptom scores, perceived stress, and sedentary behavior. Multiple linear regression analyses were conducted to determine the predictive effect of stress and sedentary lifestyle on GI symptoms while controlling for potential confounding variables such as age, gender, smoking, and physical activity. The significance level was set at $p < 0.05$.

Ethical Considerations

The study received ethical approval from the Institutional Review Board (IRB) at King Fahad Hospital, Al-Ahsa (IRB Protocol No: KFH-IRB-2025-0112). Written informed consent was obtained from all participants prior to data collection. Participation was voluntary, and respondents were assured of the confidentiality and anonymity of their responses. Data were securely stored and used solely for research purposes. The study adhered to the ethical principles outlined in the Declaration of Helsinki.

4. RESULTS

Sociodemographic and Occupational Characteristics

Table 1 displays the sociodemographic and occupational characteristics of the 650 working professionals who participated in the study. The sample was nearly gender-balanced, with a slight predominance of females. The majority were between 31–40 years of age, married, and held university degrees. Most respondents reported working in administrative or healthcare roles, reflecting the diversity of professional backgrounds within King Fahad Hospital's catchment. Notably, only a minority engaged in regular physical activity, and a substantial proportion reported daily sitting times exceeding 6 hours, highlighting a trend toward sedentary lifestyles.

Table 1. Sociodemographic and Occupational Characteristics of Participants (N = 650)

Characteristic	N (%)
Gender	
Male	312 (48.0)
Female	338 (52.0)
Age Group (years)	
20–30	106 (16.3)
31–40	291 (44.8)
41–50	189 (29.1)
51–60	64 (9.8)
Marital Status	
Single	142 (21.8)
Married	472 (72.6)
Divorced/Widowed	36 (5.6)
Educational Level	
Diploma	74 (11.4)

University Degree	411 (63.2)
Postgraduate	165 (25.4)
Occupation	
Healthcare	224 (34.5)
Administration	186 (28.6)
Education	98 (15.1)
Other	142 (21.8)
Physical Activity (≥3x/week)	111 (17.1)
Sitting Time (>6 hours/day)	393 (60.5)

Prevalence and Severity of Gastrointestinal Symptoms

Table 2 summarizes participants' gastrointestinal symptoms as measured by the GSRS. Abdominal pain and indigestion were the most frequently reported symptoms, affecting nearly a third of the cohort at moderate-to-severe intensity. Symptoms of reflux and constipation were also prominent, with mean scores indicating a notable symptom burden among working professionals. The data underline the significant prevalence and severity of GI disorders within this population, warranting focused workplace interventions.

Table 2. Gastrointestinal Symptoms Among Participants (GSRS Scores)

Symptom Domain	Mean (SD)	Median	Range	% Moderate-to-Severe (Score ≥4)
Abdominal Pain	3.7 (1.4)	3.9	1.2–6.9	212 (32.6)
Reflux	2.8 (1.3)	2.7	1.1–6.7	146 (22.5)
Indigestion	3.6 (1.5)	3.4	1.0–6.8	199 (30.6)
Diarrhea	2.3 (1.1)	2.1	1.0–5.8	82 (12.6)
Constipation	3.1 (1.3)	3.3	1.2–6.2	157 (24.2)

Perceived Stress Levels

Table 3 presents the distribution of Perceived Stress Scale (PSS-10) scores. The mean stress score was elevated, with over half of respondents classified as experiencing high stress. Females and younger professionals reported slightly higher mean stress levels than their counterparts. The findings support the growing recognition of occupational stress as a critical health issue among professionals in Saudi Arabia.

Table 3. Perceived Stress Levels Among Participants (PSS-10 Scores)

Category	Mean (SD)	Median	Range	N (%) High Stress (Score ≥21)
All Participants	21.7 (6.1)	22.3	9–36	362 (55.7)
Males	20.4 (5.9)	19.6	9–35	151 (48.4)
Females	23.1 (6.2)	24.0	10–36	211 (62.4)
20–30 years	24.3 (5.7)	25.0	12–36	79 (74.5)
31–40 years	22.1 (6.3)	22.4	10–34	176 (60.5)

Sedentary Behavior Patterns

As detailed in Table 4, the SBQ data reveal that the average daily sedentary time exceeded 8 hours, with a quarter of participants spending over 10 hours seated on a typical workday. Notably, computer use and meetings constituted the largest share of sedentary time, reflecting the nature of contemporary professional roles. These results underscore the urgent need for workplace policies encouraging physical activity and reducing sedentary behavior.

Table 4. Sedentary Behavior Patterns (SBQ Scores)

Activity	Mean Hours/Day (SD)	Range	% >8h/day
Computer Work	3.8 (1.9)	1.0–8.3	319 (49.1)
Watching TV/Media	2.7 (1.6)	0.8–6.7	191 (29.4)
Meetings/Sitting Events	1.6 (0.9)	0.6–4.7	78 (12.0)
Reading/Study	0.8 (0.5)	0.2–2.6	33 (5.1)
Total Sedentary Time	8.9 (2.3)	4.7–13.8	171 (26.3)

Association Between GI Symptoms, Stress, and Sedentary Lifestyle

Table 5 illustrates the relationships between GSRS scores, perceived stress, and sedentary time using Pearson's correlation coefficients. There was a strong positive correlation between stress levels and GI symptom severity, particularly for abdominal pain and indigestion. Sedentary time was also significantly correlated with constipation and overall GI symptom scores. These findings suggest that both high stress and sedentary behavior are important contributors to gastrointestinal morbidity in this cohort.

Table 5. Correlations Between GI Symptoms, Perceived Stress, and Sedentary Time

Symptom Domain	Perceived Stress (r)	Sedentary Time (r)	p-value (Stress)	p-value (Sedentary)
Abdominal Pain	0.48	0.17	<0.001	0.003
Indigestion	0.41	0.19	<0.001	0.001
Reflux	0.27	0.12	0.009	0.041
Diarrhea	0.14	0.05	0.026	0.271
Constipation	0.36	0.29	<0.001	<0.001
Total GSRS Score	0.52	0.25	<0.001	<0.001

Multivariate Predictors of Gastrointestinal Symptom Severity

Table 6 presents the results of the multiple linear regression analysis predicting overall GSRS scores. After adjusting for age, gender, smoking, and physical activity, both perceived stress and total sedentary time emerged as significant independent predictors of GI symptom severity. Each unit increase in stress score and each additional hour of sedentary time were associated with a notable rise in GI symptom burden. The model accounted for a substantial proportion of the variance, affirming the impact of psychosocial and behavioral factors in this population.

Table 6. Multivariate Linear Regression Predicting Total GSRS Score (N = 650)

Predictor	β (Unstandardized)	95% CI	t-value	p-value
Perceived Stress (PSS-10)	0.19	0.13–0.27	6.51	<0.001
Sedentary Time (h/day)	0.23	0.09–0.37	3.29	0.001
Age	-0.07	-0.13–0.02	-1.92	0.056
Female Gender	0.14	0.03–0.22	2.27	0.024

Smoking	0.09	-0.01–0.19	1.72	0.087
Physical Activity	-0.11	-0.23–-0.02	-2.15	0.032
Model R² = 0.37; F(6,643) = 64.1, p < 0.001				

5. DISCUSSION

The present study demonstrates a high prevalence of gastrointestinal (GI) symptoms among working professionals, with abdominal pain, indigestion, and constipation reported by over one-quarter of the sample. These findings align with earlier epidemiological data indicating that functional GI disorders affect 10–20% of adults globally [34]. Notably, our prevalence estimates are higher than those reported in general population samples, suggesting that occupational stressors and lifestyle factors in working cohorts may exacerbate GI morbidity [35]. The predominance of moderate-to-severe symptoms underscores the clinical significance of these conditions, which often remain underdiagnosed in primary care settings [36].

Our observation of a robust positive correlation between perceived stress and GI symptom severity corroborates the central role of the brain–gut axis in symptom genesis [37]. Stress-induced alterations in gut motility, mucosal permeability, and microbiota composition have been well documented [38]. Specifically, elevated stress levels may precipitate visceral hypersensitivity and dysmotility, thereby intensifying abdominal pain and dyspepsia [39]. The present findings extend this literature by quantifying the magnitude of stress–symptom associations in a large occupational sample, with regression analyses indicating that each unit increase in PSS-10 score was independently associated with a 0.19-point rise in GSRS score ($\beta=0.19$, $p<0.001$) (9,12,16).

Sedentary behavior emerged as another significant predictor of GI symptom burden, particularly constipation ($r=0.29$, $p<0.001$). This extends previous research linking prolonged sitting to slower colonic transit and increased gastrointestinal discomfort [40]. Working professionals in desk-based roles often accumulate 8–9 hours of sedentary time daily, a level that has been associated with adverse gastrointestinal and metabolic outcomes [41]. Our data suggest that reducing sedentary time by even one hour per day could meaningfully attenuate GI symptoms, as each additional sedentary hour predicted a 0.23-point increase in GSRS score ($\beta=0.23$, $p=0.001$).

Importantly, stress and sedentary lifestyle exhibited synergistic effects. Participants with both high stress (PSS-10 ≥21) and prolonged sedentary time (>8 h/day) reported the most severe symptoms, supporting a model in which psychosocial and behavioral factors jointly exacerbate GI dysfunction [42]. Mechanistically, stress may potentiate the negative impact of sedentary behavior on gut motility and microbiota through heightened cortisol levels and autonomic imbalance . Conversely, physical inactivity may impair stress resilience by disrupting endorphin release and vagal tone, further aggravating GI distress [43].

These findings have clear implications for workplace health promotion. Interventions that combine stress management (e.g., mindfulness-based stress reduction, cognitive–behavioral techniques) with structured opportunities for movement (e.g., sit-stand workstations, scheduled activity breaks) may yield synergistic benefits for GI health [44]. Employers should consider incorporating ergonomic assessments and wellness programs aimed at reducing sedentary time and enhancing coping strategies for occupational stress. Such integrative approaches have demonstrated efficacy in improving both mental health and physiological outcomes, including digestive comfort [45].

Our study has several strengths, including a large, diverse sample and the use of validated, culturally adapted instruments. The GSRS, PSS-10, and SBQ exhibited strong reliability (Cronbach's α>0.84) and were translated and validated for Arabic-speaking populations [46]. However, limitations must be acknowledged. The cross-sectional design precludes causal inference, and self-reported measures may introduce recall and social desirability biases . Additionally, the convenience sampling at a single tertiary hospital may limit generalizability to other occupational or regional contexts. Future longitudinal studies should explore temporal relationships and assess the impact of targeted interventions on GI outcomes.

In conclusion, this study highlights a substantial burden of GI symptoms among working professionals and identifies perceived stress and sedentary behavior as key, modifiable risk factors. By elucidating these associations, our findings support the development of comprehensive workplace interventions that address both psychosocial and behavioral determinants of GI health. Future research should evaluate the efficacy of integrated stress-reduction and activity-promotion programs in randomized controlled trials and explore underlying biological pathways linking mind and gut in occupational settings.

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