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# ASSESSMENT OF THE RELATIONSHIP BETWEEN GASTROESOPHAGEAL REFLUX DISEASE AND SLEEP QUALITY IN PHYSICIANS

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## Abstract

**Objectives:** Gastroesophageal reflux disease (GERD) is a common gastrointestinal condition that can impair quality of life and lead to complications. Research assistant physicians are especially at risk due to factors such as long working hours, high workload, irregular eating habits, and stress. This study aimed to assess the prevalence of GERD and its relationship with sleep quality among research assistant physicians.

**Materials and Methods:** This cross-sectional study included 446 research assistant physicians working at Selçuk University Faculty of Medicine Hospital between 2024 and 2025. Data were collected using a sociodemographic questionnaire, the Reflux Disease Questionnaire (RDQ), the Pittsburgh Sleep Quality Index (PSQI), and body composition analysis via bioelectrical impedance (BIA). Only participants meeting the inclusion criteria and providing informed consent were included. Ethical approval was obtained.

**Results:** The mean age was 28.82 years, with 43.9% male participants. GERD prevalence was found to be 42.6%. GERD was significantly associated with marital status, consumption of fatty and spicy foods, obesity, visceral fat, and poor sleep quality ($p<0.05$). Poor sleep quality was also linked to nighttime eating, light exposure at night, obesity, and shift work. Participants with GERD had significantly worse sleep quality ($p<0.001$).

**Conclusion:** GERD and poor sleep quality are prevalent among research assistant physicians and are influenced by occupational and lifestyle factors. Preventive measures, early diagnosis, and improvements in working conditions and sleep hygiene should be emphasised in health policy planning.

**Keywords:** Gastroesophageal reflux disease, physicians, sleep quality, prevalence, visceral fat, lifestyle habits.

## Introduction

Gastroesophageal reflux disease (GERD) is a chronic disorder frequently observed in industrialised societies and represents one of the leading causes of visits to primary care services. The hallmark symptoms of GERD include pyrosis, regurgitation, globus sensation, dysphagia, and retrosternal pain. If inadequately managed, these symptoms can lead to significant clinical complications, including an elevated risk of malignancies, particularly oesophageal adenocarcinoma.[1]

The pathogenesis of GERD is multifactorial, primarily involving transient relaxations and pressure abnormalities of the lower oesophageal sphincter (LES). Dietary factors such as high-fat foods and chocolate, alcohol consumption, smoking, and certain medications can reduce LES pressure and increase reflux.[2] Risk factors identified over time include age over 50, low socioeconomic status, tobacco use, excessive alcohol intake, connective tissue disorders, pregnancy, postprandial supine position, and anticholinergic medication use. Anatomical changes like hiatal hernia and increased intra-abdominal pressure, commonly seen in obese individuals, further increase the risk of GERD.[2]

Epidemiological data reveal that GERD is a prevalent health issue in Western populations, whereas its prevalence is relatively low in Eastern regions such as Asia and Africa.[4] Globally, the prevalence of GERD ranges from 2.5% to 33.1%, with a reported rate of 22.8% in Turkey as of 2017.[3,4]

Accurate diagnosis of GERD begins with a thorough clinical history emphasising symptom characterisation, including duration, severity, and relation to dietary intake, posture, and physical activity, as well as assessment of quality-of-life impact. In patients presenting with classic symptoms such as heartburn and regurgitation, presumptive diagnosis is often sufficient and can be supported by a proton pump inhibitor (PPI) trial. However, in patients who present with atypical or alarming symptoms, diagnostic investigations are recommended before empirical therapy.[2] The management of mild-to-moderate GERD typically involves lifestyle modifications and PPI therapy, with additional pharmacological or surgical interventions reserved for refractory or severe cases.[2]

GERD affects approximately 13.0% of the adult population worldwide at least once weekly, with up to 25.0% of patients experiencing sleep disturbances related to nocturnal reflux.[5] The interplay between sleep and GERD is an active area of research. Physiological changes during sleep—such as diminished oesophageal peristalsis, reduced saliva production, decreased swallowing frequency, and the supine position—contribute to prolonged oesophageal acid exposure and exacerbate GERD symptoms. Moreover, protective reflexes that limit gastric content reflux diminish, particularly during deep (N3) sleep.[6]

GERD disrupts sleep architecture by inducing frequent nocturnal awakenings and arousals. Conversely, sleep deprivation may exacerbate GERD by increasing oesophageal acid sensitivity, creating a vicious cycle in which GERD and poor sleep quality mutually reinforce each other.[7] Emerging evidence suggests a bidirectional relationship between sleep disturbances and functional gastrointestinal disorders, with sleep quality independently predicting GERD symptom severity.[8]

Given the limited data on GERD incidence and its association with sleep quality among healthcare professionals, this study aims to evaluate these parameters in research assistant physicians exposed to chronic occupational risk factors.

## Materials and Methods

*Study participants*

This study was conducted among research assistant physicians between 2024 and 2025. It was carried out in accordance with the 1964 Helsinki Declaration and its subsequent updates.

*Study population*

The current study was conducted on a total of 446 physicians, accounting for 80% of the 554 research physician participants. The participants were classified as internal medicine (n=265; 80.0%), surgical medicine (n=160; 80.0%), or basic medicine (n=21; 80.7%). Participation was voluntary. Pregnant women, those with obstructive sleep apnea syndrome (OSAS), those with a diagnosis of major depression, those with a diagnosis of Gastrointestinal System (GIS) malignancy, those who had undergone GIS surgery, and those using psychiatric medication were excluded from the study.

*Survey and Measurements*

Data were collected through a face–to–face survey consisting of four sections. The questionnaire included a sociodemographic information form (21 questions), the Reflux Disease Questionnaire (RDQ) for GERD assessment, and the Pittsburgh Sleep Quality Index (PSQI) for sleep quality. Body anthropometric measurements were performed via InBody bioelectrical impedance analysis (BIA).

Sociodemographic Information Form: This form included 21 questions regarding age, sex, marital status, number of people living in the same household, field of expertise, work schedule, tobacco and alcohol use, physical activity, chronic diseases, regular medication use, caffeine consumption, sleep habits, and the consumption of foods that increase the risk of GERD.

*Reflux Disease Questionnaire (RDQ):*

The RDQ was developed by Shaw et al. in 2001, and its Turkish validity and reliability study was conducted by Hançerlioğlu et al. in 2021.[9,10.] It is a 12-item self-reported scale assessing upper gastrointestinal symptoms over the past week. Half of the items evaluate symptom frequency, and the other half assess symptom severity. The scale includes three subscales: regurgitation, retrosternal pain, and dyspepsia. Each item is scored from 0 (none) to 5 (very severe/very frequent), with a total score ranging from 0 to 60. A total score of ≥12 indicates the presence of GERD. The scale has high internal consistency (Cronbach's alpha = 0.85).[9]

*Pittsburgh Sleep Quality Index (PSQI):*

The PSQI was developed by Buysse et al. in 1989, and its Turkish validity and reliability study was conducted by Ağargün et al. in 1996.[11,12] It is a self-reported scale consisting of 19 items that assesses sleep quality over the past month. The PSQI includes seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored between 0 and 3, with a total score ranging from 0 to 21. A total score above 5 indicates poor sleep quality. The internal consistency of the scale is good, with a Cronbach's alpha coefficient of 0.80.[12]

*Body composition analysis:*

Anthropometric measurements and body composition measurements were performed using an InBody 770 bioelectrical impedance analysis device. The measured parameters included height (using the Seca 264 stadiometer), weight, BMI, fat mass, fat-free body mass, body fat percentage (BFP), visceral fat area (VFA), and waist-to-hip ratio. BMI was classified according to the World Health Organisation (WHO) criteria. A VVA ≥100 $cm^2$ was considered high visceral fat.[13]

*Ethical Approval and Informed Consent*

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (1964) and its later amendments. Ethical approval was obtained from the Selcuk University Faculty of Medicine Ethics Committee (Decision No: 2024/366, dated July 16, 2024). Written informed consent was obtained from all participants before their enrollment. Clinical trial registration: Not applicable

*Statistical analysis*

All the data were analysed via the IBM SPSS 25.0 statistical software package. Before analysis, data normality was assessed via the Shapiro–Wilk normality test and Q–Q plots; group variance homogeneity was checked via

Levene's homogeneity test. Numerical variables in the study are presented as the means ± standard deviations, and categorical variables are presented as frequencies (n) and percentages. Sociodemographic, medical, and professional characteristics of physicians with and without GERD and those with poor and good sleep quality were compared via Pearson's chi-square test, Yates-corrected chi-square test, or Fisher–Freeman–Halton test. A p-value of <0.05 was considered to indicate statistical significance. Factors influencing the presence of GERD and sleep quality among physicians were identified via binary logistic regression analysis. Odds ratios are reported with 95.0% confidence intervals.

## Results

A total of 446 physicians were included in the study. Among the participants, 43.9% were male, and 56.1% were female, with a mean age of 28.82 years. Of the physicians, 44.8% were single, and 55.2% were married. Regarding their living arrangements, 25.6% lived alone, 16.8% with their parents, 33.4% with their spouses, 21.7% with their spouses and children, and 2.5% with others. In terms of physical activity, 40.6% did not engage in any, 45.3% exercised 1–2 times per week, and 14.1% exercised ≥3 times per week. Consumption of tomato paste and spicy foods was reported as follows: 1.8% once a month, 16.8% 1–2 times per week, 45.5% 3–5 times per week, and 35.9% daily. According to BMI distribution, 3.8% of the physicians were underweight, 49.3% were of normal weight, 33.2% were overweight, and 13.7% were obese. The sociodemographic characteristics are summarised in Table 1.

The frequency of married physicians was significantly higher in the GERD group (frequency: 63.7%) compared to those living alone (p=0.002). The frequency of physicians engaging in physical activity three or more times per week was significantly lower in the GERD group (frequency: 7.9%) (p=0.004). Daily consumption frequency of tomato paste and spicy foods was higher among physicians with GERD (frequency: 46.8%) than those without (frequency: 27.7%) (p<0.001). Eating within two hours before bedtime (frequency: 41.6% vs. 32.4%; p=0.011) and consuming three or more cups of tea/coffee per day (frequency: 63.7% vs. lower; p<0.001) were also significantly more frequent in the GERD group. Obesity (frequency: 25.3%) and high visceral fat levels (frequency: 59.5%) were significantly more prevalent in physicians with GERD (p<0.001). No significant differences were found between groups regarding sex, smoking, alcohol use, chronic disease presence, or regular medication use (p>0.05). There was no association between department or work schedule and GERD prevalence (p>0.05). The prevalence of poor sleep quality was significantly higher in the GERD group (frequency: 76.8%) compared to those without GERD (frequency: 40.2%) (p<0.001) (Table 2).

**Table 1.** Lifestyle habits of the physicians

| Feature | n | (%) |
|---|---|---|
| **Food Before Sleep** | | |
| No | 121 | (27.2%) |
| Sometimes | 163 | (36.5%) |
| Yes | 162 | (36.3%) |
| **Tea-Coffee Consumption** | | |
| No tea-coffee intake | 8 | (1.8%) |
| 1-2 cups a day | 200 | (44.8%) |
| ≥3 cups per day | 238 | (53.4%) |
| **Use of a night light** | | |
| No | 413 | (92.6%) |
| Yes | 33 | (7.4%) |
| **Blackout Curtain Usage** | | |
| No | 245 | (54.9%) |
| Yes | 201 | (45.1%) |
| **Using the Phone Before Going to Sleep** | | |
| No | 52 | (11.7%) |
| Yes | 394 | (88.3%) |
| **Visceral Fat** | | |
| Normal | 253 | (56.7%) |
| High (≥100cm$^2$) | 193 | (43.3%) |
| **Cigarette Use** | | |
| Never smokers | 278 | (62.3%) |
| Former smokers | 18 | (4.0%) |
| Occasionally | 60 | (13.5%) |
| Current smokers | 90 | (20.2%) |
| **Alcohol Use** | | |
| Non drinker | 379 | (85.0%) |
| Occasionally | 52 | (11.7%) |
| User | 15 | (3.3%) |
| **Presence of Chronic Disease** | | |
| None | 406 | (91.0%) |
| Yes | 40 | (9.0%) |
| **Drugs** | | |
| No drugs | 425 | (95.3%) |
| Yes | 21 | (4.7%) |
| **Total** | 446 | (100.0%) |

**Table 2.** Associations between sociodemographic, health status and occupational characteristics of physicians and the frequency of gastroesophageal reflux disease

| Variable | GERD Present (n=190) | No GERD (n=256) | *p* |
|---|---|---|---|
| **Gender** | n (%) | n (%) | 0.923[1] |
| Male | 83 (43.7%) | 113 (44.1%) | |
| Woman | 107 (56.3%) | 143 (55.9%) | |
| **Marital Status** | n (%) | n (%) | 0.002[1] |
| Single | 69 (36.3%) | 131 (51.2%) | |
| Married | 121 (63.7%) | 125 (48.8%) | |
| **Person Living in** | n (%) | n (%) | 0.007[1] |
| Alone | 35 (18.4%) | 79 (30.9%) | |
| Parents | 31 (16.3%) | 44 (17.2%) | |
| Spouse | 74 (38.9%) | 75 (29.3%) | |
| Spouse-child | 48 (25.3%) | 49 (19.1%) | |
| Other* | 2 (1.1%) | 9 (3.5%) | |
| **Physical Activity** | n (%) | n (%) | 0.004[2] |
| No | 85 (44.7%) | 96 (37.5%) | |
| 1-2 times a week | 90 (47.4%) | 112 (43.8%) | |
| ≥3 times per week | 15 (7.9%) | 48 (18.8%) | |
| **Spicy Sauce Consumption** | n (%) | n (%) | <0.001[2] |
| Once a month or never | 0 (0.0%) | 8 (3.1%) | |
| 1-2 times a week | 20 (10.5%) | 55 (21.5%) | |
| 3-5 times a week | 81 (42.6%) | 122 (47.7%) | |
| Every day | 89 (46.8%) | 71 (27.7%) | |
| **Food Before Sleep** | n (%) | n (%) | 0.011[1] |
| No | 38 (20%) | 83 (32.4%) | |
| Sometimes | 73 (38.4%) | 90 (35.2%) | |
| Yes | 79 (41.6%) | 83 (32.4%) | |
| **Tea-Coffee Consumption** | n (%) | n (%) | <0.001[2] |
| No tea-coffee intake | 2 (1.1%) | 6 (2.3%) | |
| 1-2 cups a day | 67 (35.3%) | 133 (52.0%) | |
| ≥3 cups per day | 121 (63.7%) | 117 (45.7%) | |
| **BMI (kg/m²)** | n (%) | n (%) | <0.001[1] |
| Underweight (<18,5) | 3 (1.6%) | 14 (5.5%) | |
| Normal (18,5-24,9) | 73 (38.4%) | 147 (57.4%) | |
| Overweight (25-29,9) | 66 (34.7%) | 82 (32.0%) | |
| Obese (≥30) | 48 (25.3%) | 13 (5.1%) | |
| **Visceral Fat** | n (%) | n (%) | <0.001[1] |
| Normal | 77 (40.5%) | 176 (68.8%) | |
| High (≥100cm²) | 113 (59.5%) | 80 (31.3%) | |
| **Sleep Quality** | n (%) | n (%) | <0.001[1] |
| Poor sleep quality | 146 (76.8%) | 103 (40.2%) | |
| Good sleep quality | 44 (23.2%) | 153 (59.8%) | |
| **Total** | **190 (100.0%)** | **256 (100.0%)** | |

[1]Pearson chi-square test, [2]Fisher-Freeman-Halton test, *: Spouse-child–parent, friend, sibling, mother-child

No significant differences were observed between sleep quality and mean age (p=0.164) or sex distribution (female: 55.4% vs. 56.9%; p=0.762). Marital status, living arrangements, smoking, alcohol consumption, physical activity, tea/coffee intake, use of blackout curtains, and cell phone use before bedtime showed no significant correlation with sleep quality (p>0.05). However, eating within two hours before sleep (41.4% vs. 29.9%; p=0.002) and night light use (10.4% vs. 3.6%; p=0.010) were significantly higher in physicians with poor sleep quality. The frequency of not eating before sleep was lower in this group (20.9% vs. 35.0%; p=0.002).

Physicians with poor sleep quality had a lower frequency of normal BMI (40.6% vs. 60.4%) and a higher prevalence of obesity (18.9% vs. 7.1%; p<0.001). High visceral fat levels were more common (52.2% vs. 32%; p<0.001), while normal visceral fat levels were less common (47.8% vs. 68.0%; p<0.001). Chronic disease and regular medication use were not associated with sleep quality (p>0.05).

Regarding occupational factors, poor sleep quality was more frequent among those working in surgical branches (42.2% vs. 27.9%; p=0.004) and less frequent among those in internal branches (54.6% vs. 65.5%; p=0.004). The rate of working only standard hours was lower (22.1% vs. 39.6%), while shift and combined work schedules were higher (72.7% vs. 56.9%; p<0.001) in the poor sleep quality group. GERD prevalence was significantly greater in physicians with poor sleep quality (58.6% vs. 22.3%; p<0.001) (Table 3).

Logistic regression analysis showed that the risk of GERD was 1.84 times higher in married physicians compared to singles (OR=1.838; p=0.002). The risk was 2.22 times higher in those living with their spouses (OR=2.227; p=0.002) and 2.21 times higher in those living with spouses and children (OR=2.221; p=0.006). Physicians exercising 1–2 times per week had a 2.57-fold increased risk (OR=2.571; p=0.004), and those who never exercised had a 2.83-fold increased risk (OR=2.833; p=0.002) compared to those exercising ≥3 times per week. Consumption of tomato paste and spicy foods 3–5 times per week increased risk by 2.09 times (OR=2.091; p=0.012), and daily consumption increased risk by 3.95 times (OR=3.949; p<0.001). Eating within two hours before sleep increased the risk by 2.08 and 1.77 times (p=0.004, p=0.023). Overweight physicians had a 3.76-fold risk (OR=3.756; p=0.044), obese physicians a 17.23-fold risk (OR=17.231; p<0.001). High visceral fat increased risk 3.23 times (OR=3.229; p<0.001). Poor sleep quality increased GERD risk by 4.93 times (OR=4.929; p<0.001) (Table 4)

Logistic regression analysis showed that poor sleep quality was 2.32 times higher in physicians who ate within two hours before sleep (OR=2.316; p=0.004) and 1.81 times higher in those who sometimes ate before sleep (OR=1.808; p=0.015). Night time light use increased the risk of poor sleep quality by 3.16 times (OR=3.159; p=0.005). High visceral fat was associated with a 2.32-fold increase (OR=2.323; p<0.001). Physicians in surgical departments had a 3.10-fold higher prevalence of poor sleep quality compared to those in basic medicine

(OR=3.103; p=0.016). Shift plus overtime workers had 2.29 times higher poor sleep quality prevalence than those working only standard hours (OR=2.286; p=0.002). GERD diagnosis increased the risk 4.93 times (OR=4.929; p<0.001) (Table 5).

**Table 3.** Relationships between sociodemographic, health status and occupational characteristics of physicians and sleep quality

| Variable | Poor Sleep Quality (n=249) | Good Sleep Quality (n=197) | *p* |
|---|---|---|---|
| **Food Before Sleep** | n (%) | n (%) | 0.002[1] |
| No | 52 (20.9%) | 69 (35.0%) | |
| Sometimes | 94 (37.8%) | 69 (35.0%) | |
| Yes | 103 (41.4%) | 59 (29.9%) | |
| **Use of a night light** | n (%) | n (%) | 0.010[3] |
| No | 223 (89.6%) | 190 (96.4%) | |
| Yes | 26 (10.4%) | 7 (3.6%) | |
| **BMI (kg/m²)** | n (%) | n (%) | <0.001[1] |
| Underweight (<18,5) | 9 (3.6%) | 8 (4.1%) | |
| Normal (18,5-24,9) | 101 (40.6%) | 119 (60.4%) | |
| Overweight (25-29,9) | 92 (36.9%) | 56 (28.4%) | |
| Obese (≥30) | 47 (18.9%) | 14 (7.1%) | |
| **Visceral adiposity** | n (%) | n (%) | <0.001[1] |
| Normal | 119 (47.8%) | 134 (68.0%) | |
| High (≥100 cm²) | 130 (52.2%) | 63 (32.0%) | |
| **Department** | n (%) | n (%) | 0.004[1] |
| Basic medicine | 8 (3.2%) | 13 (6.6%) | |
| Internal medicine | 136 (54.6%) | 129 (65.5%) | |
| Surgical medicine | 105 (42.2%) | 55 (27.9%) | |
| **Work Shift** | n (%) | n (%) | <0.001[1] |
| Day shift | 55 (22.1%) | 78 (39.6%) | |
| Day shift + night shift | 181 (72.7%) | 112 (56.9%) | |
| Night shift | 13 (5.2%) | 7 (3.6%) | |
| **GERD** | n (%) | n (%) | <0.001[1] |
| No | 103 (41.4%) | 153 (77.7%) | |
| Yes | 146 (58.6%) | 44 (22.3%) | |
| **Total** | **249 (100.0%)** | **197 (100.0%)** | |

BMI: Body mass index; GERD: Gastroesophageal reflux disease. [1]Pearson chi-square test, [2]Fisher-Freeman-Halton test, [3]Chi-square test with Yates continuity correction

**Table 4.** Evaluation of the factors affecting the GERD status of physicians via logistic regression analysis

| Variable | OR (95% CI) | *p* |
|---|---|---|
| **Marital status** | | |
| Single (Ref) | - | - |
| Married | 1.838 (1.254 – 2.706) | 0.002 |
| **A person living in** | | |
| Alone (Ref) | - | - |
| Parents | 1.590 (0.865 – 2.928) | 0.135 |
| Spouse | 2.227 (1.343 – 3.740) | 0.002 |
| Spouse-child | 2.211 (1.264 – 3.905) | 0.006 |
| Other* | 0.502 (0.074 – 2.073) | 0.393 |
| **Physical activity** | | |
| ≥3 per week (Ref) | - | - |
| 1-2 times a week | 2.571 (1.380 – 5.027) | 0.004 |
| No | 2,833 (1,510 - 5,572) | 0.002 |
| **Spicy Sauce Consumption** | | |
| ≤2 times per week (Ref) | - | - |
| 3-5 times a week | 2.091 (1.192 – 3.791) | 0.012 |
| Every day | 3.949 (2.216 – 7.271) | <0.001 |
| **Food Before Sleep** | | |
| No (Ref) | - | - |
| Sometimes | 1.772 (1.087 – 2.916) | 0.023 |
| Yes | 2.079 (1.277 – 3.422) | 0.004 |
| **Tea and coffee consumption** | | |
| No tea-coffee intake (Ref) | - | - |
| 1-2 cups a day | 3.103 (0.699 – 21.468) | 0.171 |
| ≥3 cups per day | 1.511 (0.338 – 10.505) | 0.619 |
| **BMI** | | |
| Underweight (Ref) | - | - |
| Normal weight | 2.317 (0.728 – 10.280) | 0.197 |
| Overweight | 3.756 (1.166 – 16.788) | 0.044 |
| Obese | 17,231 (4.796 – 83.427) | <0.001 |
| **Visceral adiposity** | | |
| Normal (Ref) | - | - |
| High (≥100cm$^2$) | 3.229 (2,188 - 4,797) | <0.001 |
| **PDQI (Sleep Quality)** | | |
| Good sleep quality (Ref) | - | - |
| Poor sleep quality | 4.929 (3,262 - 7,558) | <0.001 |

OR: Odds ratio; CI: Confidence interval; Ref: Reference category; BMI: Body mass index; PDQI: Pittsburgh Sleep Quality Index; n: Number of participants. Ref: Reference Category *: Spouse-child–parent, friend, sibling, mother-child.

**Table 5.** Evaluation of the factors affecting the sleep quality of physicians via logistic regression analysis

| Variable | OR (95% CI) | *p* |
|---|---|---|
| **Food Before Sleep** | | |
| No (Ref) | - | - |
| Sometimes | 1.808 (1.126 – 2.918) | 0.015 |
| Yes | 2.316 (1.436 – 3.766) | <0.001 |
| **Use of a night light** | | |
| No (Ref) | - | - |
| Yes | 3.165 (1.415 – 8.057) | 0.008 |
| **BMI** | | |
| Underweight (Ref) | - | - |
| Normal weight | 0.754 (0.274 – 2.043) | 0.576 |
| Overweight | 1.460 (0.520 – 4.035) | 0.462 |
| Obese | 2.984 (0.960 – 9.316) | 0.057 |
| **Visceral adiposity** | | |
| Normal (Ref) | - | - |
| High (≥100cm$^2$) | 2.324 (1.579 – 3.442) | <0.001 |
| **The department he works in** | | |
| Basic medicine (Ref) | - | - |
| Internal medicine | 1.713 (0.699 – 4.455) | 0.248 |
| Surgical medicine | 3.102 (1.233 – 8.265) | 0.018 |
| **Working order** | | |
| Day shift (Ref) | - | - |
| Day shift + night shift | 2.292 (1.513 – 3.493) | <0.001 |
| Night shift | 2.634 (1.011 – 7.408) | 0.053 |
| **GERD** | | |
| No (Ref) | - | - |
| Yes | 4.929 (3.262 – 7.558) | <0.001 |

OR: Odds ratio; CI: Confidence interval; Ref: Reference category; BMI: Body mass index; GERD, gastroesophageal reflux disease. Ref: Reference Category

## Discussion

This study investigated the prevalence of gastroesophageal reflux disease (GERD) among physicians, an occupational group exposed to irregular working hours, night shifts, heavy workload, and high psychosocial stress, and examined its relationship with sleep quality. Physicians are known to experience greater physiological and psychosocial stress than the general population, which may predispose them to both gastrointestinal and sleep-related disorders. Therefore, understanding the interaction between GERD and sleep disturbances is essential for developing preventive strategies and occupational health interventions.

In the present study, the prevalence of GERD among physicians was 42.6%, which is higher than rates reported in both national and international studies. In Turkey, Mungan et al. reported a GERD prevalence of 24.7% using the GERD-Q, and Ercelep et al. reported a prevalence of 21.7% among hospital workers using the RDQ.[14,15] Internationally, prevalence rates vary, with reports of 57.6% among rescue team healthcare personnel in the United States and 27.4% among physicians in Indonesia. [16,17] These differences may be attributed to variations in diagnostic tools, symptom thresholds, working environments, and occupational stress levels. The relatively high prevalence observed in this study may reflect the cumulative effects of night shifts, irregular meal timing, and sustained clinical and academic stress among physicians.

Significant differences in GERD prevalence were observed according to marital status and living arrangements. While Bert et al. reported a higher prevalence of GERD among married individuals in Italy, [18] Kim et al. found no significant association between marital status and GERD. [19] These inconsistent findings may reflect cultural differences in lifestyle behaviours associated with marriage. In the present study, the higher GERD prevalence among married physicians may be related to late evening meals and increased caloric intake, suggesting that social factors should be evaluated in terms of their influence on lifestyle habits rather than assumed to be inherently protective.

Lifestyle-related factors played a substantial role in GERD development. Physical inactivity increased GERD risk approximately 2.8-fold, while frequent consumption of spicy, fatty, and sauced foods increased the risk up to fourfold. In addition, consumption of tea or coffee within two hours before bedtime and intake exceeding three cups per day were significantly associated with GERD, consistent with previous studies.[20] The demanding work schedules of physicians often lead to irregular meals and reliance on easily accessible but unhealthy food choices, which may exacerbate GERD symptoms.

Obesity and visceral fat accumulation were identified as the strongest predictors of GERD. Obese physicians had approximately a 17-fold higher risk compared with those of normal weight, supporting established pathophysiological mechanisms whereby increased intra-abdominal pressure contributes to lower oesophageal sphincter dysfunction.[21] Moreover, visceral adiposity independently increased GERD risk more than threefold, emphasising the role of metabolically active visceral fat and proinflammatory cytokines in GERD pathogenesis, independent of body mass index.[22]

Poor sleep quality was strongly associated with GERD. Physicians with poor sleep quality had nearly a fivefold higher prevalence of GERD. Similar associations have been reported by Ju et al., who demonstrated that insomnia significantly increased GERD risk,[23] and by Gurges et al., who reported reduced sleep efficiency and total sleep duration among GERD patients.[6] These findings support a bidirectional relationship in which nocturnal reflux symptoms impair sleep quality, while sleep disturbances exacerbate GERD through mechanisms such as autonomic imbalance, delayed gastric emptying, and increased visceral sensitivity.

Poor sleep quality was present in 55.8% of physicians in this study, consistent with findings among healthcare workers in Turkey and Brazil.[24,25] Factors such as eating close to bedtime and sleeping with night lighting were more common among physicians with poor sleep quality. Nogueira et al. demonstrated that shorter meal-to-

sleep intervals negatively affect sleep quality,[26] while Alie et al. reported that sleeping in a dark environment improves sleep outcomes.[27] Additionally, obesity and increased visceral fat were associated with poor sleep quality, in line with evidence suggesting that obesity affects sleep through respiratory, hormonal, and inflammatory pathways.[28] Poor sleep quality was also more prevalent among physicians working in surgical specialities and shift-based schedules, consistent with previous findings.[25]

An important finding of this study is that GERD prevalence was approximately 4.93 times higher among physicians with poor sleep quality. Jansson et al. similarly reported a higher prevalence of GERD among individuals with sleep disorders.[29] This bidirectional relationship may be explained by increased transient lower oesophageal sphincter relaxations, delayed gastric emptying, increased intra-abdominal pressure, autonomic nervous system dysregulation, and heightened pain perception.

From a primary care perspective, GERD and sleep disorders warrant particular attention. Family physicians are uniquely positioned to identify modifiable risk factors, provide lifestyle counselling, and assess sleep quality during routine care. Early recognition and management of GERD may improve sleep health, quality of life, and work productivity among physicians.

Overall, these findings emphasize the importance of addressing occupational stressors, sleep hygiene, and metabolic risk factors to reduce the burden of GERD and sleep disturbances among physicians. Further prospective and interventional studies are required to clarify causal relationships and evaluate the effectiveness of targeted preventive strategies.

Conclusions and Recommendations

Physicians constitute a high-risk group for both gastroesophageal reflux disease and poor sleep quality. Modifiable factors, particularly obesity, visceral fat accumulation, unhealthy dietary habits, physical inactivity, and disrupted sleep patterns, play a central role in this association. Institutional policies aimed at improving working conditions, regulating work hours, facilitating access to healthy food options, and encouraging regular physical activity are essential.

Within family medicine practice, early diagnosis of GERD, lifestyle education, and routine assessment of sleep quality may substantially improve health outcomes and quality of life. Integrating sleep health monitoring and metabolic risk assessment into preventive healthcare strategies for physicians is strongly recommended. Future longitudinal and comprehensive studies are needed to better elucidate causal pathways and to inform effective prevention and management programs.

**Ethical Considerations:** The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (1964) and its later amendments. Ethical approval was obtained from the Selcuk University Faculty of Medicine Ethics Committee (Decision No: 2024/366, dated July 16, 2024). Written informed consent was obtained from all participants before their enrollment.

**Conflict of Interest:** The authors declare no conflict of interest.

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