Prevalence of Gastroesophageal Reflux Disease, Its Association With Eating Behavior and Psychological Disturbance, and Its Impact On Quality Of Life, Among Medical Students In The MENA Region, A Multinational Cross-Sectional Study

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Introduction

Gastroesophageal reflux disease (GERD) is a common gastrointestinal disease. It is a chronic condition that is characterized by the regurgitation of stomach contents into the esophagus and is associated with heartburn. The occurrence of these symptoms for at least two weeks increases the likelihood of having GERD. Other GERD symptoms include chest pain, nausea, dysphagia, burping, water brash, and vomiting(Argyrou et al., 2018; Richter & Rubenstein, 2018). All these symptoms negatively affect the patients' quality of life. The pathophysiology of GERD is multifactorial(Lee & McColl, 2013). Several factors have been suggested to cause GERD, including a hypotensive lower esophageal sphincter (LOS) and a defect in the gastric sling/clasp muscle fiber component(Hershcovici et al., 2011; Orlando, 2001).

The global prevalence of GERD is about 13.98%(Nirwan et al., 2020) with variation among different countries and ethnic groups. In East Asia, it ranges from 2.5% to 7.5%, 8.5 to 25.9% in Europe, 18.1% to 27.8% in South and North America, and about 11.6% in Australia. In the Middle East, it ranges from 8.7% to 33.1%(El-Serag et al., 2014).

Several risk factors have been identified that increase the likelihood of having GERD. Obesity was found to be one of the risk factors that increases GERD. Also, dietary habits such as spicy food, coffee drinks, or administering NSAIDs increase the prevalence of having GERD(Jarosz & Taraszewska, 2014).

On the other hand, psychological factors also play an important role in GERD severity. Both stress and anxiety are linked to an increase in GERD. A previous study showed that stress can increase heartburn symptoms in patients with heartburn(He et al., 2022) and also increase in anxiety level was associated with an increase in esophageal reflux(Song et al., 2013). Finally, depression was found to be associated with GERD, which can be explained by a change in the eating behavior in depressed patients(Mohammad et al., 2019).

Rationale

Medical students suffer from a study burden, which increases their level of anxiety and stress. They also have a higher likelihood of having trouble with eating behavior or having a lot

of coffee daily. This increases their likelihood of having GERD. In the Middle East, fewer studies have assessed the effect of GERD. A recent cross-sectional study assessed the prevalence of GERD among medical students in Egypt. They found a prevalence of 17.1%. They found an association between increasing stress levels and increasing GERD severity. Also, smoking was a significant risk factor for GERD symptoms. Another cross-sectional study among medical students in 21 universities in Egypt. They reported a prevalence of 28.4%. Again, they found that an increasing level of stress and anxiety was associated with increasing GERD severity. Finally, Two cross-sectional studies were conducted in Saudi Arabia. They reported a prevalence of 23.8% and 23.1% respectively. To our knowledge, no study has assessed the GERD and its related quality of life among medical students in Middle East and linked their findings with eating behaviour

Research Questions

1. What is the prevalence of GERD among medical students and interns, its risk factors, its impact on health-related quality of life, and psychological disturbance?
2. What is the impact of eating behavior on GERD prevalence?

Aim

To improve the quality of life among medical students and interns in the Middle East countries

Objectives

1. To assess the prevalence of GERD among medical students and interns in the Middle East
2. To assess the effect of GERD on health-related quality of life
3. To assess the associated risk factors of GERD
4. To assess the impact of eating behavior on GERD prevalence
5. To assess the impact of stress, anxiety, and depression on increasing GERD prevalence

Methodology

Technical design

1. **Study design**: Cross-sectional study

2. **Setting**: Medical students in some Middle East countries (Egypt, Sudan, Somalia, Libya, Morocco, United Arab Emirates, Jordan, Saudi Arabia, Yemen, Iraq, and Palestine)
3. **Time**: From August 2025 to December 2025
4. **Population**: Arabic Medical students and interns in the MEAN region
5. **Inclusion Criteria**
    - Medical students and interns studying medicine in the Middle East countries
    - Have access to online platforms
6. **Exclusion Criteria**
    - Students or interns who refused to participate
7. **Sampling**

    We calculated the total sample size using Epi Info version 7.2.60(Epi InfoTM | CDC, n.d.) Assuming a 28.4% (Essa et al., 2024) prevalence rate and a 5% error margin with a 95% confidence interval, the sample size required for each country is 312. After adding a 10% nonresponse rate, the final sample size is about 343 for each country, so the total sample size will be 3773
8. **Sampling Technique**: Convenience Sampling

Operational design

1. **Pilot**: We will perform a pilot study in each country before starting the study to assess the readiness of the questions and the reliability of the questions via the Cronbach's alpha test.
2. **Study field**: an online questionnaire will be shared via an online platform with the target population.
3. **Data collection method**

    An online questionnaire will be shared via social media platforms, including Facebook, WhatsApp, and Telegram.

    The questionnaire consists of 6 sections

- The first section discusses the importance of the study for the participants, informing them that their data will be used only for research purposes, and obtaining informed consent
- The second section asks about the sociodemographic data and associated risk factors such as age, sex, residency, GPA, smoking, BMI, and eating habits
- The third section contains the GERDQ questionnaire(Jones et al., 2009). It is composed of 6 Likert scale questions that ask about GERD symptoms such as heartburn, nausea, and regurgitation. Each question has 4 answers scored from 0 to 3, making a rank from 0 to 18. If the participant scores 8 or more, this diagnoses GERD. Furthermore, the symptoms severity can be assessed. A score of 0-2 makes 0 % of having GERD, 3-7 makes a 50% likelihood of having GERD, 8-10 makes a 79% and 11-18 makes a 89% of having GERD. This questionnaire has a sensitivity being 65% and a specificity being 71% to diagnose GERD
- The Fourth section asks about the quality of life for GERD patients. We used the GERD-HRQL(Velanovich, 2007). This is a 16 Likert scale questionnaire that asks about the effect of GERD symptoms on the quality of life. The first 15 questions had 6 answers, ranging from no symptoms to Symptoms that are incapacitating – unable to do daily activities. This score ranges from 0 to 5. The sixteenth question asks about the present condition. The quality of life is calculated via the first 15 questions (scores from 0 to 75), with higher scores indicating lower quality of life.
- The fifth section asks about eating behavior. We used the Dutch Eating Behavior Questionnaire (DEBQ)(van Strien et al., 1986). This is a 33 Likert scale questionnaire that assesses the eating behavior in three items (retained eating, emotional eating, and External eating). Each question is composed of 5 answers (from never to very often) and scores range from 1 to 5.

- The final section asks about stress, anxiety, and depression using the DASS-21(Lovibond & Lovibond, 2015) questionnaire. This is composed of 21 Likert scale questions, each had 4 answers scored from 0 to 3. The scale is divided into 3 sections to assess depression, stress, and anxiety. The cumulative score for each part will be multiplied by two for interpretation of the severity of each section.
    1. For the Depression score, 0-9 indicates a normal person, 10-13 indicates mild symptoms, 14-20 indicates moderate, 21-27 indicates severe symptoms, and 28+ indicates extremely severe symptoms.
    2. For anxiety scores, 0-7 indicates a normal person, and (8-9), (10-14), (15-19), and 20+ indicate mild, moderate, severe, and extremely severe levels of anxiety.
    3. For stress scores, 0-14 indicates a normal person. A score of (15-18), (19-25), 26-33), and 34+ indicate a mild, moderate, severe, and extremely severe levels of stress.

4. Statistical analysis

First, data will be summarized according to its type. Categorical data will be summarized using frequency and percentage. Continuous data will be tested for normality. If the data is normally distributed, we will summarize it using mean and SD, and if not, median and IQR will be used. We will assess the difference between the population according to their sociodemographic data using a Chi-square and a Mann-Whitney U test. A p-value of <0.05 will be used as a cutoff point for statistically significant results. We will assess the correlation between all continuous data (GERD, GERD-HRQL, DEBQ, and DASS-21). Finally, a multiple linear regression test will be used to assess the relationship between the assessed variables.

Administrative design

1. **Ethical consideration**
    - The study protocol will be approved by the Institutional Review Board of Zagazig University, Faculty of Medicine
    - Study participants will be included after informed consent.
2. **Confidentiality and data retention**

    Data collected will be kept confidential.
3. **Risks and benefits of the participants**

    There is no cost for this study

Results

Collected data will be presented in tables and suitable graphs, and analyzed according to standard statistical methods.

Discussion

Discussion will be done on the results compared to the relevant literature and scientific Research

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