



Original Article

A Study on Association of Stress Related Problems with Gastrointestinal Disorders in University Students

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ABSTRACT

Psychological stress may lead to different physiological problems in the gastrointestinal tract (GIT). **Objective:** To study the association of stress with gastrointestinal (GIT) disorders as stress has been found to play a key role in the pathophysiology of the human body. **Methods:** A cross-sectional study including 300 female students from different departments of Lahore College for Women University, was done. The females were categorized into two groups. Group A (n=111) comprises females of age between 15 to 20 years. Group B of age group between 21 to 28 years including 189 females (n= 189). Demographic measurements such as weight, height and BMI were taken of all subjects. Stress, bloating, acidity in the stomach, iron supplements and intake of junk food was reported via questionnaire. All the data were collected and analyzed. **Results:** The mean age±SD of group A was (18.80±1.40013) and the mean age±SD of group B was (22.42±1.447). In group A, 77% of females take stress and in group B, 82% of females take stress out of 111 with (p<0.001). 16% of females feel bloating in the stomach in group A and 23% of females in group B with (p<0.002). 36% of females feel acidity in group A and 49% in group B with (p<0.002). 70% of females take junk food regularly in group A and 71% in group B with (p<0.001). **Conclusions:** The percentage of stress and GIT problems was slightly higher in the larger age group.

INTRODUCTION

Stress is the reaction of the body to any change which requires any modification or response. These responses can be physical, emotional or mental. Stress can cause disturbance in the body's homeostasis [1, 2] which leads to several physical symptoms such as upset stomach, chest pain, elevated blood pressure and headache [3]. Stress is associated with six of the leading reasons of death including; cancer, heart disease, lung diseases, accidents, liver cirrhosis, and suicide [4]. Several environmental factors such as financial conditions, work pressures, family situations and social problems, contribute to stress. All of these conditions produce psychological stress which may lead to different physiological problems in the

gastrointestinal tract (GIT) including; gut motility, mucosal barrier functions, gastric secretion and mucosal permeability. However, stress is linked to specific GIT problems in all working groups, but it is more prevalent in working groups with stressful jobs [5]. This relationship between gastric functions and emotions has been studied since the late 19th and beginning of the 20th century by Charles Cabanis and William Beaumont which were followed by pioneers Ivan Pavlov, Walter Canon and Stewart Wolf, who determine the gastric response after a stress stimulus in the animal models [6, 7]. Based on these studies many researchers further study the relationship of stress and gastric functions [8]. Such as in case of a fistulated

patient, increased motility in gastric functions was shown in case of anger but declined gastric motility in case of fear [9]. Different studies have also linked stress with various symptoms of irritable bowel syndrome (IBS), such as constipation, gas, diarrhea and bloating [10]. Emotional stress and also personality patterns have an important impact on GIT functions as studies have shown the mental anxiety, privation, and fatigue linked to gastric ulceration. While stress might lead to a pathological condition, e.g., a peptic ulcer. A strong correlation has also been found between symptoms of peptic ulcer onset and long-past tension history, domestic upset and financial stress. There is significant co-morbidity between some other GIT problems, including functional dyspepsia and IBS and mood alterations such as anxiety and depression [11]. However, the role of stress in gastric functions has been closely examined but the main pathological link between gut functions and stress is still missing. The main limitation might be due to the invasiveness of most of the techniques which are used for GIT evaluations [9]. So, the main objective of this research was to investigate the association of stress with gastrointestinal disorders in university students.

METHODS

To evaluate the stress problems and their contributing factors in GIT problems in young females, a random sample of 300 females of 15 to 30 years of age group were selected from Lahore College for Women University, Lahore. Written consent was taken from the participants. The quality method used involved the questionnaire filled out by the participants. This study was designed to include females only due to the high frequency of stress disorders among females according to a WHO report. The design of study was cross-sectional and conducted for a period of 7 months starting from October 2019 to April 2020. Data for the nutritional status and other parameters were collected by a structured questionnaire that included information on age, weight, sociodemographic, height, social habits, medical history and diet. The type of food was classified into Yes, No. Data were collected from students of different departments and from college girls. For diet analysis, the consumed diets were classified into low, intermediate and high bioavailability diet which depended on the content of Vitamin C. A low diet contains <30 grams of meat poultry or fish or <25 mg of ascorbic acid daily. An intermediate diet contains 30 to 90 g of meat, poultry or fish, or 25 to 75 mg of ascorbic acid daily. A high availability diet may contain more than 90 g of meat poultry or fish or >75 mg of ascorbic acid. Alternately, a high-availability diet may contain 30 to 90 g of meat poultry or fish plus 25 to 75mg of ascorbic acid. The sample was collected from different age groups of females. This survey was conducted to check out the

stress associated problems with stomach problems in young females. Two groups were formed. Standing height was measured using the height measuring tape in feet. Height was measured by removing shoes. Standing in a manner that the back of the body is against the wall with feet together, the back of the feet, shoulders and the head touching the wall to ensure the body is as straight as possible. The head level position was marked with the pencil and by using the measuring tape from ground up to figure out the height. The measured height was then converted into a meter. Weight was measured by using weight machine. The participants were requested to remove shoes and step in the center of the horizontal platform and look straight ahead, standing relax but still then observed the position of pointer on the scale and the note reading. Quantitative analysis that is the BMI of young students was calculated using height in meters (m) and weight in kilograms(kg) by using the following formula; $BMI(kg/m^2) = \text{weight} / \text{height}^2$

Nutritional habits were calculated in females of different age groups. The questionnaire concluded the list of question like weekly intake of meat, fruits and vegetables. The quantity was categorized into Yes, No. The quantity of junk food was calculated by categories the weekly intake of junk food into the Yes, No. Intake of milk/ tea/ fizzy drinks was calculated through a questionnaire that concluded the list of questions like weekly intake of milk/ tea/ fizzy drinks. The quantity was categorized into Yes, No. The health-related questions were asked to check their association of stress related problems with gastrointestinal disorders in young females.

RESULTS

The study was conducted on 300 subjects, which were distributed into two groups. Group A concluded females of age 15 to 20 years (n= 111). The other group B concluded females of age 21 to 28 years (n=189). Figure 1 represented the continuous variables of Group A and Group B. The continuous variables used in this study were age, weight, height and BMI. The mean and standard deviation of both groups were calculated. The mean age with a standard deviation of Group A and B was 18.80 ± 1.40 and 22.42 ± 1.44 respectively. The mean height with a standard deviation of Group A and B was 1.63 ± 0.36 and 3.64 ± 1.86 respectively. The mean weight with standard deviation of Group A and B was 52.29 ± 9.97 and 53.72 ± 8.21 . The mean BMI with standard deviation of Group A and B was 21.96 ± 19.58 and 20.86 ± 3.28 .

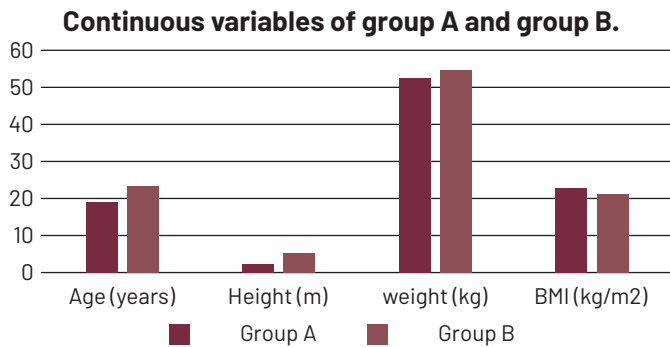


Figure 1: Continuous variables of groups A and B

Table 1 showed the characteristics of group A which included the parameters i.e.; stress, bloating, acidity and iron and junk food intake. The females who take stress in group A were 77% with a mean value of 0.77 and those who didn't were 23% and the mean value was 0.23. The females who felt bloating in the stomach were 16% with a mean value of 0.16 and those who didn't feel bloating was 83% with a mean value of 0.83. The females who felt acidity in the stomach were 36% with a mean value of 0.36 while those who didn't have acidity were 64% and the mean value was 0.64. The females who took iron supplements were 63% and the mean value was 0.63 and those who didn't was 37% with a mean value of 0.37. The females who had intake of junk food were 70% with mean value of 0.70 and who didn't were 30% and the mean value was 0.30. All these characters had significant p value i.e. $p < 0.001$.

Table 1: Characteristics of Group A

| Characteristics | Total N=111 | Mean | Percentage % | p=value |
|------------------|-------------|------|--------------|---------|
| Stress | | | | |
| Yes | 86 | 0.77 | 77 | 0.0001 |
| No | 25 | 0.23 | 23 | |
| Bloating | | | | |
| Yes | 18 | 0.16 | 16 | 0.0002 |
| No | 92 | 0.83 | 83 | |
| Acidity | | | | |
| Yes | 40 | 0.36 | 36 | 0.0002 |
| No | 71 | 0.64 | 64 | |
| Iron | | | | |
| Yes | 70 | 0.63 | 63 | 0.0001 |
| No | 41 | 0.37 | 37 | |
| Junk food | | | | |
| Yes | 78 | 0.70 | 70 | 0.0001 |
| No | 33 | 0.30 | 30 | |

Table 2 represented the characteristics of group B. The females who took stress in group B were 82% with a mean value of 0.82 while those who didn't were 18% with mean value of 0.18. The females who felt bloating in stomach were 23% with a mean value of 0.23 and those who didn't feel were 77% and the mean value was 0.77. The females who felt acidity in stomach was 49% with mean value of

0.49 and the females who didn't have acidity was 51% and the mean was 0.51. The females who took iron supplements was 61% with mean value of 0.61 and who didn't take iron supplements was 39% and the mean value was 0.39. The females who had intake of junk food was 71% with a mean value of 0.71 and who didn't intake junk food were 29% with mean value of 0.29. All these characters had significant p value i.e. $p < 0.001$.

Table 2: Characteristics of Group B

| Characteristics | Total N= 189 | Mean | Percentage % | p=value |
|------------------|--------------|------|--------------|---------|
| Stress | | | | |
| Yes | 155 | 0.82 | 82 | 0.0001 |
| No | 34 | 0.18 | 18 | |
| Bloating | | | | |
| Yes | 43 | 0.23 | 23 | 0.0002 |
| No | 146 | 0.77 | 77 | |
| Acidity | | | | |
| Yes | 93 | 0.49 | 49 | 0.0001 |
| No | 96 | 0.51 | 51 | |
| Iron | | | | |
| Yes | 115 | 0.61 | 61 | 0.0001 |
| No | 74 | 0.39 | 39 | |
| Junk food | | | | |
| Yes | 134 | 0.71 | 71 | 0.0001 |
| No | 55 | 0.29 | 29 | |

The Figure 2 showed the comparison between age and stress of group A and B.

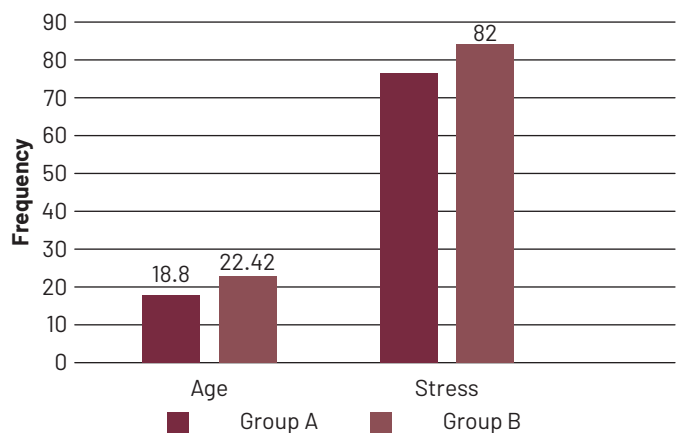


Figure 2: Comparison between the age and stress of groups A and B

The Figure 3 represented the comparison between stress and bloating of group A and B.

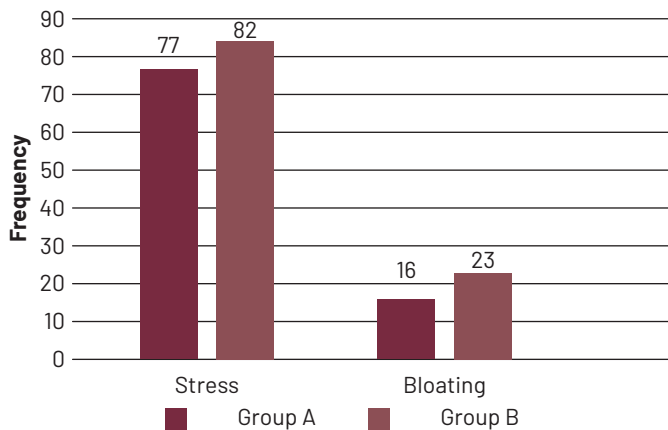


Figure 3: Comparison between the stress and bloating of groups A and B

The Figure 4 showed the comparison between stress and acidity of groups A and B.

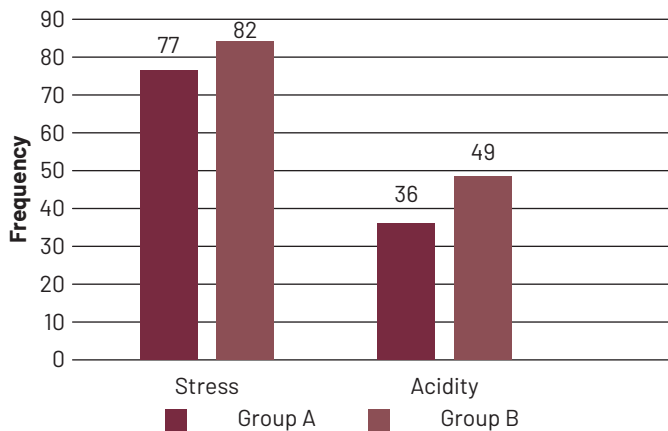


Figure 4: Comparison between the stress and acidity of groups A and B

The Figure 5 showed the comparison between bloating and acidity of groups A and B.

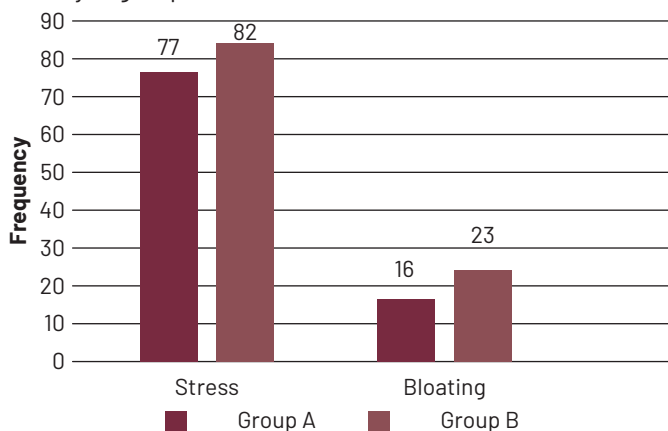


Figure 5: Comparison between the acidity and bloating of groups A and B

DISCUSSION

Many people die worldwide from diseases caused by the

relationship between anxiety, stress problems, emotional state and vital organs [12]. Among these pathologies, gastrointestinal tract (GIT) problems have become a major clinical issue [13]. Stress can disturb the organism's homeostasis psychologically or physically. Several studies have indicated that stress delays the emptying of the stomach, impairs motility of gastro-duodenum, modifies the gastric secretions and colonic motility and changes the pancreatic output and intestinal transit [14, 15]. Due to its potential effects on pathophysiological processes of GIT motility, stress is considered an important factor in the maintenance, exacerbation and development of GIT disorders related symptoms. GIT motility problems are studied by various clinical markers including abnormal gastric emptying. This condition is explained by studying how the body responds defensively in stress conditions to achieve psychological and physical balance. However, these adaptive systems become maladaptive due to repeated activation because of chronic and frequent stress problems that lead to pathological conditions [16, 17]. The present study included 300 samples collected from different departments of Lahore College for Women University, Lahore using questionnaire. The samples were collected from the female population of different age groups. A cross-sectional and random sampling was used to collect data from 300 females (n= 300). This survey included questions to assess the stress-related problems with gastrointestinal disorders. The questionnaire was designed and structured to include demographic information and dietary intake. Various questions were asked in a questionnaire regarding anthropometric measurements like (Height, Weight, BMI), nutritional factors, acidity, bloating, food intake etc. In this study first of all the two groups were made. In group A the females were of the age between 15 to 20 years. In group A, out of 111 females 77 females had stress issues and 16 females felt bloating and 36 females had acidity in their stomach. The 70 females out of 111 had intake of junk food in their lifestyle therefore their stomach become disturbed. In group B, females were between ages of 21 to 28 years. In this age group, the females who took stress had many problems of stomach. Their stomach becomes disturbed. In group B, out of 189 females the 82 females had stress problems and due to stress 27 females felt bloating and 49 females had acidity in their stomach. The 29 females out of 189 took junk food causing more stomach issues. In this study, it was analyzed that stress affect the health of people in many adverse ways. The main focus of this study was to study the effect of stress on GIT problems, it was observed that stress disturbed the stomach, as it causes acidity and bloating in the stomach. Due to indigestion the stomach was disturbed. Bloating, acidity and indigestion are

important factors of gastrointestinal disorders. In group B (larger age group), the stress percentage was high as compared to group A as well as the acidity and bloating have high percentages indicating the correlation of stress to GIT problems. This increase in stress level can be due to the job or social stress that increases with passing years in university students. This study provided more evidence for properties of the visceral sensitivity index (VSI) which is a potential measure to assess the GI-specific anxiety (GIS). VSI scores are analyzed to evaluate IBS and GIS [18]. As in one study, VSI score was evaluated in ~349 university students. The main finding of this study concluded VSI as a significant mediator to determine the correlation between stress and GIS and IBS symptoms [19]. Severance *et al.*, studied the correlation between GIT problems and mental diseases, mainly, the schizophrenia. They conclude that some of the risk factors for schizophrenia including stress and some intolerances also contribute in altering the gut microbiota and eventually causing GIT problems [20]. Other several studies have linked social problems with stress and have studied the association between stress and GIT problems. Kennedy *et al.*, have also connected high level of stress with worsening of symptoms of GIT problems [21]. The sample used for the analyses of symptoms of GIT problems severity was relatively small while the replication in a larger sample group is essential. Moreover, to find the mediator role of stress in GIT problems mainly relied on correlation techniques that may not establish definitive causal links. It is evaluated that the females in university take stress which leads to gastrointestinal problems. So, they should not take stress. If there is no stress then there will not be any GIT problems. This is also important that the use of junk food also disturbs the stomach.

CONCLUSIONS

This study concluded that stress is harmful for any age group of females. So, people should avoid taking stress. The authors declare no conflict of interest.

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females owing to various financial and social issues and it leads to gastrointestinal problems which are accompanied by unhealthy eating habits among young females.

Authors Contribution

[2] Conceptualization: FA
Methodology: SH
[3] Formal analysis: SHW, BZ
Writing-review and editing: BZ, FH

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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