



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF  
**PHARMACEUTICAL SCIENCES**

<http://doi.org/10.5281/zenodo.2560718>

Available online at: <http://www.iajps.com>

Research Article

**RISK FACTORS OF PEPTIC ULCER DISEASE AMONG MALE AND FEMALE MEDICAL STUDENT AND INTERNS IN DIFFERENT CITIES IN KINGDOM OF SAUDI ARABIA**

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**Abstract**

**Background:** Potential risk factors of PUD include family history, smoking, medications such as non-steroidal anti-inflammatory and antibiotic, some dietary habits, daily life habits and stress.

**Objective:** We aimed to estimate the prevalence of PUD risk factors among male and female medical student and interns in different cities in Kingdom of Saudi Arabia in addition to describing the symptoms of PUD.

**Methods:** A cross-sectional observational study was conducted using a self-administered paper questionnaire. In addition, data about the participants' weight and height measurements was collected to calculate the body mass index. P values less than 0.05 were considered statistically significant.

**Results:** A total of 396 male participants and 460 female participants from different cities in Saudi Arabia took part in this study and were included in the statistical analysis. The most common risk factors of PUD were stress (94.2%), eating spicy food (72.8%) and using NSAIDs (42.2%). Data showed that high BMI ( $p < 0.001$ ), living in a high-altitude city ( $p < 0.001$ ), smoking ( $p < 0.001$ ), alcohol consumption ( $p < 0.001$ ) and eating spicy food ( $p = 0.007$ ) were more common among males while using NSAIDs was more common among females ( $p < 0.001$ ). The most common symptom of PUD included abdominal pain (55.1%), followed by changes in appetite (40.2%) and heartburn (36.8%).

**Conclusion:** Results showed a considerably significant differences between male and female medical students and interns when it comes to the risk factors of PUD. Identifying the most common symptoms and risk factors of PUD will allow earlier detection and accordingly better management of the disease in Kingdom of Saudi Arabia.

**Keywords:** Peptic ulcer disease, smoking, high altitude, Saudi Arabia, abdominal pain, NSAIDs.

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Please cite this article in press Mohammad Eid Mahmoud Mahfouz et al., Risk Factors Of Peptic Ulcer Disease Among Male And Female Medical Student And Interns In Different Cities In Kingdom Of Saudi Arabia., Indo Am. J. P. Sci, 2019; 06(02).

**INTRODUCTION:**

Peptic ulcer disease (PUD) includes both duodenal and gastric ulcers caused by mucosal damage due to pepsin and gastric acid secretion [1,2]. A systematic review conducted during the last decade to estimate the global prevalence and incidence of peptic ulcer disease revealed an annual incidence rate of 0.10 to 0.19% which means that of each 1000 individuals worldwide, one or two will develop physician-diagnosed peptic ulcer disease every year [1]. Although it's a common condition, peptic ulcer is difficult to be detected in asymptomatic individuals [1].

It is considered a common gastrointestinal disorder that can result from excessive use of non-steroidal anti-inflammatory drugs (NSAIDs) or the infection with *Helicobacter pylori* bacteria with increased risk among elderly population, smokers, alcohol consumers and obese individuals [1].

The most common risk factors for developing peptic ulcers are using non-steroidal anti-inflammatory drugs and the infection with *H. pylori* bacteria. However, due to the efficient eradication of *H. pylori* bacteria and the increasing use of NSAIDs, the latter became the most common risk factor for developing PUD especially among the older population [1,2,3,4].

Recent studies showed that high level of stress can also be implicated as a risk factor for PUD [1,2]. Although there are very few studies conducted about how gender affects the incidence of the disease, a study conducted in 2012 revealed that male gender can be a risk factor for developing PUD [1]. On the other hand, Kim J. et al (2017) stated that PUD was associated with increased weight and high body mass index in women [1]. Other studies provided evidence that smoking is a major risk factor for many gastrointestinal disorders including PUD, inflammatory bowel disease (IBD) in addition to tumors of the gastrointestinal tract [1].

However, there are few findings in the literature regarding correlation of gender to PUD prevalence. And accordingly, the aim of this cross-sectional observational study was to estimate the prevalence of risk factor of inflammatory bowel disease among male and female medical students and interns in different cities in Kingdom of Saudi Arabia. The presence of symptoms of PUD among the same population was assessed.

**METHODS:**

A cross-sectional observational study was designed to estimate the prevalence of risk factors of PUD among male and female medical student and interns

in different cities in Kingdom of Saudi Arabia. A total of 856 adult participants of both genders were included in the study. Prevalence of the risk factors among males was compared to that among females. Data about the symptoms associated with PUD was also collected and analyzed.

Data was collected using a self-administered paper questionnaire. Data about the weight and height of the participants was collected for body mass index (BMI) calculation.

The scope of the data collected also included socio-demographic characteristics (age, sex, study year, family income, GPA, weight, height and BMI), personal habits (smoking, alcohol use, dietary habits, and stress) and medications used (NSAID, antibiotics). That was in addition to the family history of the participants and signs and symptoms of PUD (abdominal pain, bloody stools, bloody vomiting, heartburn and family history of PUD).

From the data collected about the participant's weight and height, the BMI was calculated using the formula ( $BMI = \text{weight in kg}/\text{height in m}^2$ ). The participants were classified into 4 categories according to the WHO BMI classification established in 1998<sup>1</sup>: underweight ( $BMI < 18.5 \text{ kg/m}^2$ ), normal weight ( $BMI = 18.5-24.9 \text{ kg/m}^2$ ), over-weight ( $BMI = 25-29.9 \text{ kg/m}^2$ ), and obese ( $BMI \geq 30 \text{ kg/m}^2$ ).

**DATA COLLECTION:**

Prior to data collection, all participants were informed about the nature of the study and their participation is voluntary, then the electronic consents were obtained from those who agreed to participate in the study. All participants in the study were Saudi medical students from deferent cites in Saudi Arabia.

**Statistical methodology:**

Data were statistically described in terms of frequencies (number of cases) and valid percentages for categorical variables. Mean, standard deviations, minimum and maximum were used to describe numerical variable. Comparison of categorical variables between the subgroups (cross-tabulation) was done using Chi-square test. P values less than 0.05 were considered statistically significant. All statistical calculations were done using computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 21 for Microsoft Windows.

**RESULTS:****Study population**

There were 856 students and interns involved in this study. The mean± SD age of the enrolled population was 23.27± 1.53 years, with the eldest being 30 and the youngest being 19 years old. Male participants constituted 46.3% of the population included in the study while 53.7% were females and 7.6% of the participants were married.

The mean± SD height was 165.27± 9.19 cm while the mean± SD weight was 68.38± 19.27 kg and the mean± SD calculated BMI value was 24.8± 5.9 kg/m<sup>2</sup>.

Out of the 856 participants, 22.9% were fourth year students, 22.1% were fifth year students, 33.1% sixth year students while 22% were interns.

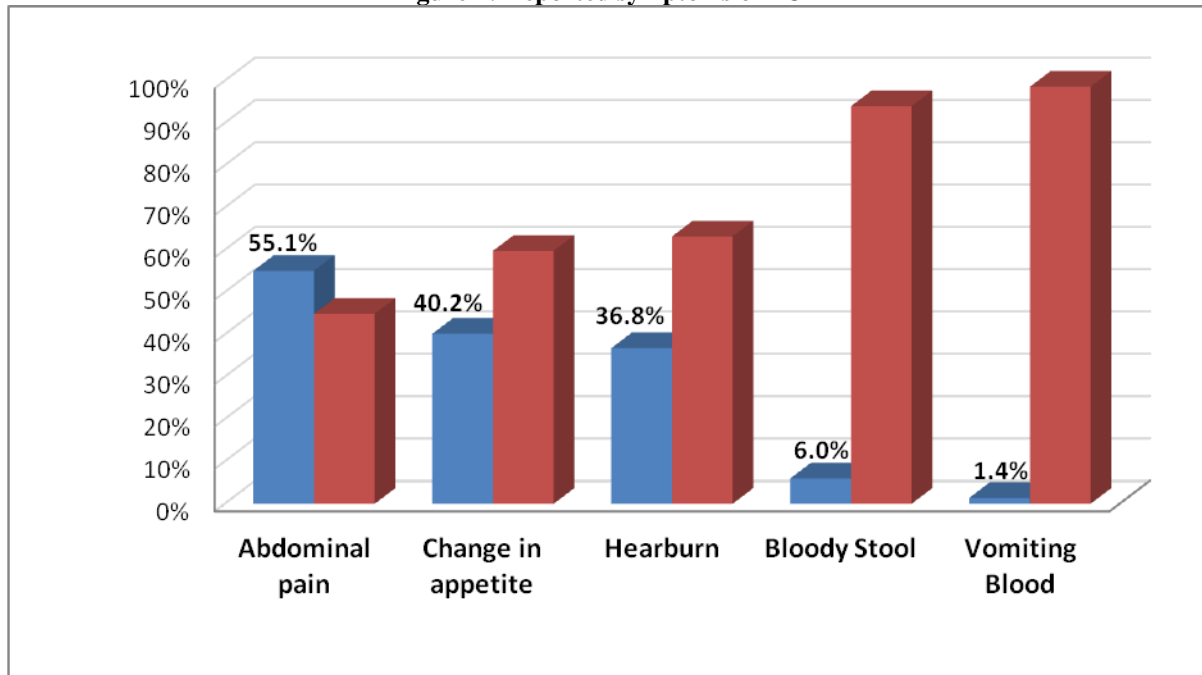
As for data about participant's hometown, 8.9% were from the eastern region, 20% came from the middle region, 8.8% came from the northern region, 15.9% came from the southern region, and 46.5% came from the western region. Around 72.5% of the participants came from areas of normal altitude and 27.5% were from high altitude towns.

Table 1 shows more details about participants' characteristics.

**Table 1 Characteristics of study population (n=856)**

		Frequency	Percent
<b>Sex</b>	<b>Female</b>	460	53.7
	<b>Male</b>	396	46.3
	<b>Total</b>	856	100.0
<b>Year</b>	<b>4th year</b>	196	22.9
	<b>5th year</b>	189	22.1
	<b>6th year</b>	283	33.1
	<b>Intern Doctor</b>	188	22.0
	<b>Total</b>	856	100.0
<b>Marital Status</b>	<b>Married</b>	65	7.6
	<b>Unmarried</b>	791	92.4
	<b>Total</b>	856	100.0
<b>Region</b>	<b>East region</b>	76	8.9
	<b>Middle region</b>	171	20.0
	<b>North region</b>	75	8.8
	<b>South region</b>	136	15.9
	<b>West region</b>	398	46.5
	<b>Total</b>	856	100.0
<b>GPA</b>	<b>1.00-2.00</b>	17	2.0
	<b>2.01-3.00</b>	177	20.7
	<b>3.01-3.50</b>	305	35.6
	<b>3.51-4</b>	357	41.7
	<b>Total</b>	856	100.0
<b>Income</b>	<b>5000-10000 SR</b>	181	21.1
	<b>less than 5000 SR</b>	96	11.2
	<b>more than 10000 SR</b>	579	67.6
	<b>Total</b>	856	100.0

More than half of the participants (55.1%) reported that they suffer from abdominal pain with variant intensities. Heartburn affected 36.8% of the included population. In addition, 40.2% said that they experience changes in appetite. Only 1.4% reported vomiting blood and 6.0% have bloody stools. More details are provided in figure 1.

**Figure 1: Reported symptoms of PUD**

#### Prevalence of PUD risk factors among males and females

Almost half of the population was considered as having a normal body weight. There was a significant difference when males and females were compared ( $P < 0.001$ ). It was found that more females were underweight (11.7%) and normal weight (55.7%) while the numbers of males who were overweight (24.4%) and obese (21.2%) were higher.

The majority of participants (72.5%) were not living in high altitude regions. This was reported by 78% of the females and 66.2% of the males.

Most of the participants 84.1% said that they are non-smokers and 93.6% said that they don't drink alcohol. The numbers of males who smoke and those who drink alcohol were significantly higher among males than females ( $p < 0.001$ ).

Stress was a widespread in the population with more females (95.2%) reporting feeling that they are under stress than males (92.9%).

About 77.3% of the males ate spicy foods. This was significantly more than the females (68.9%). ( $P = 0.007$ )

Despite that 70.7% of the males did not use NSAIDs, more than half the females 53.3% used NSADs. ( $p < 0.001$ ). As for antibiotic, 15.2% of the population reported using antibiotics recently with no significant difference between females and males.

As for the family history of PUD, 71.6% of the population stated that they had no family history. There was no significant difference between males and females ( $p = 0.595$ ).

More details about the prevalence of PUD risk factors among males, females and the overall study population are shown in table 2.

**Table 2 Prevalence of risk factors of PUD among males, females and overall study population**

Gender		Total	Male	Female	P value*
<b>BMI grade</b>	<b>Underweight</b>	9.5%	6.8%	11.7%	<b>&lt;0.001</b>
	<b>Normal weight</b>	50.1%	43.7%	55.7%	
	<b>Overweight</b>	24.4%	28.3%	21.1%	
	<b>Obese</b>	16.0%	21.2%	11.5%	
<b>High altitude</b>	<b>Yes</b>	27.5%	33.8%	22.0%	<b>&lt;0.001</b>
	<b>No</b>	72.5%	66.2%	78.0%	
<b>Smoking</b>	<b>Yes</b>	15.9%	25.5%	7.6%	<b>&lt;0.001</b>
	<b>No</b>	84.1%	74.5%	92.4%	
<b>Alcohol</b>	<b>Yes</b>	6.4%	11.9%	1.7%	<b>&lt;0.001</b>
	<b>No</b>	93.6%	88.1%	98.3%	
<b>Stress</b>	<b>Yes</b>	94.2%	92.9%	95.2%	0.188
	<b>No</b>	5.8%	7.1%	4.8%	
<b>Eating spicy food</b>	<b>Yes</b>	72.8%	77.3%	68.9%	<b>0.007</b>
	<b>No</b>	27.2%	22.7%	31.1%	
<b>NSAIDs</b>	<b>Yes</b>	42.2%	29.3%	53.3%	<b>&lt;0.001</b>
	<b>No</b>	57.8%	70.7%	46.7%	
<b>Antibiotics</b>	<b>Yes</b>	15.2%	13.1%	17.0%	0.127
	<b>No</b>	84.8%	86.9%	83.0%	
<b>Family history of PUD</b>	<b>Yes</b>	28.4%	29.3%	27.6%	0.595
	<b>No</b>	71.6%	70.7%	72.4%	
*Chi square test was used to compare the prevalence of each risk factor between males and females.					

**DISCUSSION:**

To the best of our knowledge, the current study is the first study to assess the prevalence of risk factors of peptic ulcer disease among Saudi population from different cities in Kingdom of Saudi Arabia in addition to comparing the prevalence between male and female medical students and interns.

We concluded that BMI grade, living in a high altitude city, smoking, alcohol consumption and eating spicy food showed significantly higher prevalence among males compared to females ( $p < 0.001$ ,  $< 0.001$ ,  $< 0.001$ ,  $< 0.001$  and 0.007 respectively).

All of these risk factors were significantly more prevalent among males compared to females. On the

other hand, females reporting using NSAIDs were more than males ( $p < 0.001$ ).

A study conducted in USA stated that twice as many men as women had peptic ulcer disease in the United States although the ulcer prevalence rates for women have increased whereas rates for men have decreased. This decrease in the male to female ratio has resulted from a decrease in self-reported prevalence rates for men and an increase in self-reported prevalence rates for women. [2] While a study conducted in 2017 in Arar, Northern Saudi Arabia to describe the "Profile of peptic ulcer disease and its risk factors" concluded that the gender of the participants and their marital status did not have any significance. Our study agreed with this study that spicy food and prolonged

use of Non-steroidal anti-inflammatory drugs (NSAIDs) were significant risk factors for developing PUD. In contrast, our study found that stress was not a significant risk factor for PUD [2]. A zambian study reported that of the confirmed risk factors of PUD was use of NSAIDs, alcohol drinkers and smoking [2].

In 2017, Lee et al conducted a study to compare the prevalence of risk factors between subjects with symptomatic PUD and asymptomatic PUD. Like our study, alcohol was found to be significant especially with symptomatic patients ( $p=0.025$ ) although there were no significant differences in age, sex, BMI, smoking, H. pylori infection, use of NSAIDs, ulcer location, or ulcer number. On the other hand, the difference was significant between healthy controls and PUD patients in general. PUD patients were predominantly male and smokers. Higher BMI played a significant role in being a risk factor for asymptomatic patients. The use of NSAIDs was a risk factor for symptomatic PUD but not for asymptomatic PUD in the present study, and H. pylori infection was a risk factor for both symptomatic and asymptomatic PUD. NSAIDs caused GIT symptoms even in healthy individuals [2]. In 2017, a study found a correlation increased weight and high body mass index in women and PUD [13].

As for the PUD associated symptoms, pain was our most common finding (55.1%) followed by changes in appetite (40.2%) and heartburn (36.8%). Only 1.4% reported vomiting blood and 6.0% have bloody stools.

Another study conducted with children and adolescents in KSA found that the most prevalent symptoms were chronic abdominal pain as reported in 15/24 (63%) of the children. As for blood found in vomit or stool, the percentages reported were 13% and 8% respectively. The symptoms were more commonly in boys. [2]

Heartburn, loss of appetite, indigestion, regurgitation, nausea and vomiting and with chest pain were reported in other studies too [17,12]. This was in addition to 22.7% complaining of melena while only 10.6% reported hematemesis [17].

### CONCLUSION:

The most prevalent risk factors of PUD were stress, eating spicy food and using NSAIDs. By comparing males to females, it was found that high BMI, living in a high altitude city, smoking, alcohol consumption and eating spicy food were more common among males while using NSAIDs was more common among females.

More comparative studies are needed in order to establish a more clear profile of PUD in Saudi Arabia and identify the risk factors associated with the disease. This will allow earlier detection and more efficient management of the disease that will finally enhance the quality of life of PUD patients in Kingdom of Saudi Arabia.

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