

## Awareness and Knowledge Among Medical Students Regarding Lower Gastrointestinal Bleeding Etiologies in Riyadh, Saudi Arabia

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### Abstract

**Background:** Lower gastrointestinal bleeding is known as hemorrhage which originates from the lower gastrointestinal system. Undergraduate students must have adequate knowledge of this topic to help them in their practice and to be effectively engaged with their patient's assessment and diagnosis.

**Objectives:** This study aims to assess the awareness and knowledge among medical students about lower gastrointestinal bleeding etiology in the governmental universities of Riyadh, Saudi Arabia.

**Materials and methods:** This cross-sectional study was conducted using a prepared electronic self-reported questionnaire among medical students at four different universities in the Riyadh region. After collecting the data, MS Word was used for data entry while SPSS version 23 was used for data analysis.

**Results:** In this study, a total number of 1,129 responses were collected from students at four different universities. Most of the participants (61.6%) were between 21-23 years old. In general, it was shown that 58.2% of students have enough knowledge regarding the symptoms related to lower gastrointestinal bleeding. Moreover, the participant medical students have chosen the hemorrhoids (33.2%) to be the leading cause followed by diverticulosis (20.0%), and anal fissures (11.1%).

**Conclusion:** It was found that among the more than 1000 medical students in Riyadh region, Saudi Arabia, the awareness level toward symptoms and causes of lower GI bleeding is inadequate. There is a need to improve the awareness of medical students regarding lower GI bleeding presentation, particularly those in pre-clinical years.

**Keywords:** Awareness; Causes; Gastrointestinal bleeding; Medical students; Knowledge.

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DOI: 10.21608/svuijm.2024.270808.1810

Received: 1 February, 2024.

Revised: 28 February, 2024.

Accepted: 29 February, 2024.

Published: 3 March, 2024

**Cite this article as:** Khalid I. AlHussaini, Abdulmajeed Mansour Alzeer, Saud Musaab Aldughaiter, Majed Ghanem Alharbi, Abdullah Hassan Alkahtani, Bader Faisal Alsayed, Rayan Muhammad Alsultan. (2024). Awareness and Knowledge Among Medical Students Regarding Lower Gastrointestinal Bleeding Etiologies in Riyadh, Saudi Arabia. SVU-International Journal of Medical Sciences. Vol.7, Issue 1, pp: 419-428.

## Introduction

Lower gastrointestinal bleeding (LGIB) is known as a hemorrhage that originates from the lower gastrointestinal system, distal to the Treitz Ligament and superior to the anus (Strate, 2005; Jehangiri et al., 2017). It is also described as bleeding produced from the large intestine, anus, or rectum. Also, hospital admission rates per year due to gastrointestinal bleeding in Western countries including the United States and Great Britain is 150/100000 and the mortality rate among these patients is elevated, and these findings have encouraged healthcare providers in other countries to work on further investigations that aim to appreciate the burden and prevalence of cases with gastrointestinal (GI) bleeding in their nation's hospitals (Jehangiri et al., 2017).

Acute LGIB is responsible for almost 20% of cases of GI bleeding. These cases usually lead to hospitalization with good and favorable outcomes. Most patients with LGIB bleeding complain of hematochezia (red or maroon blood from the rectum) (Adegboyega and Rivadeneira, 2020). Nevertheless, in some cases where the bleeding is from the right colon or the cecum, the presentation can mimic that of upper GI bleeding with patients complaining of melena (black tarry stool). Patients with severe upper gastrointestinal bleeding (UGIB) may exhibit signs of LGIB, with hematochezia occurring in 15% of UGIB patients (Strate and Gralnek, 2016). LGIB usually stops spontaneously in most patients. However, in patients with severe cases or comorbidities, they require immediate medical assistance. Additionally, the bleeding risk is increased with advancing age and as a result, the outcomes of gastrointestinal bleeding clearly could worsen with the older population, which gives medical students and physicians a reason to predict more serious underlying

causes with advanced age groups presented with such symptoms (Strate, 2005). Hematochezia was the most common symptom in the patients, with maroon stools as well as melena being less common (Jehangiri et al., 2017).

The most common cause of LGIB is Colonic diverticulosis followed by internal hemorrhoids, then ischemic colitis and post-polypectomy bleeding (Ghassemi and Jensen, 2013). Other etiologies include malignancy, infectious colitis, radiation colitis, non-specific colitis, and inflammatory bowel disease (Elimeleh Y and Gralnek IM, 2024). After several literature reviews, we could not find any study that has evaluated the level of knowledge and awareness of medical students regarding different etiologies of lower GI bleeding. The undergraduate students must have adequate knowledge regarding this topic to help them in their practice and to effectively engage with their patient's assessment and diagnosis, which will have a significant impact and a better outcome for their patients in the future. Therefore, this study aims to assess medical students' awareness and knowledge of lower gastrointestinal bleeding etiology at Riyadh's governmental universities, in Saudi Arabia.

## Materials and methods

Ethical approval was obtained from the Institutional Review Board of IMSIU (HAPO-01-R-011) project number 87-2020. At the beginning of the online survey, informed consent was obtained. This cross-sectional study was conducted among medical students from four governmental universities in Riyadh region, Saudi Arabia including Imam Mohammad Ibn Saud Islamic University (IMSIU), King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), King Saud University and Princess Nourah Bint Abdulrahman University. The study included medical

students of both sexes and from all academic years.

The study was conducted using an online self-reported questionnaire that was distributed among students through electronic websites including various social media after obtaining electronic consent to participate in the study and IRB Form approval obtained from the IRB committee of Imam Mohammed Ibn Saud Islamic University for ethical clearance, where informed consent and confidentiality would be maintained because no information such as ID, names, and phone numbers. The questionnaire began with participant demographic information such as age, gender, university, marital status, and academic level.

Additionally, the assessment included participants' awareness of the symptoms of LGIB using closed-ended questions for which each correct answer earned one point and total points were collected; participants were assumed to be aware if more than half of the points were obtained. Furthermore, the present study included questions regarding the causes of LGIB using the 5-Likert scale and then students were asked about their perceptions of public awareness campaigns and their source of knowledge.

### Statistical analysis

Following data collection, MS Word was used for data entry, while SPSS version 23 was used for data analysis. Frequency and percent were used to describe categorical variables, and the chi-test was used to analyze the relationship between demographic factors and the level of awareness, with all statements considered significant if the p-value was less than or equal to 0.05.

### Results

In this study, 1,129 responses were collected from students at different four universities. Most of the participants (61.6 %) were between the ages of 21-23, while 23% were between the ages of 18 and 20. Additionally, the gender percentages are nearly equal, with males accounting for 50.01% of participants and singles accounting for 97.4%. Furthermore, 43.7% of students attended Imam Mohammad Ibn Saud Islamic University (IMSIU), while 20.2% attended King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), 19% attended King Saud University, and 17.1% attended Princess NourahBint Abdul Rahman University. (**Table .1**) shows that 25.2% of students were in their third academic year, while 21.8% were in their fourth year, and 52.4% were in their pre-clinical years.

**Table 1. Demographic factors of participants (N=1129).**

Variables		Count	Column N (%)
Age	18-20	260	23.0
	21-23	695	61.6
	24-26	135	12.0
	27 or more	39	3.5
Gender	Male	565	50.01
	Female	564	49.99
Marital status:	Single	1100	97.4
	Married	29	2.6
	KSAU-HS	228	20.2
	PNU	193	17.1

<b>University</b>	<b>IMSIU</b>	493	43.7
	<b>KSU</b>	215	19.0
<b>Academic year?</b>	<b>First year</b>	114	10.1
	<b>Second year</b>	215	19.0
	<b>Third year</b>	284	25.2
	<b>Fourth year</b>	246	21.8
	<b>Fifth year</b>	211	18.7
	<b>Intern</b>	59	5.2

KSAU-HS: King Saud Bin Abdulaziz University for Health Sciences; PNU: Prince Nourah Bint Abdulrahman University; IMSIU: Imam Mohammad Ibn Saud Islamic University; KSU: King Saud University

In terms of participants' knowledge of LGIB and related symptoms, it was discovered that 61.7% of students were aware that symptoms of lower GI bleeding differ from those of upper GI bleeding. Furthermore, 22.2% of students thought that hematemesis could be a symptom of lower GI bleeding. In comparison, 44.3 and 51.1% of students knew melena could be a symptom of lower and upper GI bleeding, respectively, according to the present study.

Additionally, 59.3% knew that hematochezia is a symptom of lower GI bleeding. However, it was discovered that at least 21.4% of participants reported a state of "I do not know" for most of the questions. Furthermore, 84.3% of participants agreed that it is important for general practitioners to be aware of different etiologies of lower GI bleeding and 79.3% agreed that lower GI bleeding is a medical emergency (**Table. 2**).

**Table 2. The participants' knowledge considering the symptoms of LGIB.**

<b>Questions</b>		<b>Count</b>	<b>Column N (%)</b>
<b>Massive upper GI bleeding can present with symptoms similar to lower GI bleeding</b>	Agree	696	61.7
	Not Agree	432	38.3
<b>Is hematemesis considered a symptom of lower GI bleeding?</b>	Yes	232	22.2
	No	587	56.2
	I do not know	225	21.6
<b>Is melena considered a symptom of lower GI bleeding?</b>	Yes	462	44.3
	No	359	34.4
	I do not know	223	21.4
<b>Is melena considered a symptom of upper GI bleeding?</b>	Yes	533	51.1
	No	235	22.5
	I do not know	276	26.4
<b>Is Hematochezia considered a symptom of lower GI bleeding?</b>	Yes	619	59.3
	No	106	10.2
	I do not know	319	30.6
<b>Do you think it is important for the general practitioner</b>	Yes	951	84.3
	No	56	5.0

<b>to be aware of different etiologies of lower GI bleeding?</b>	I do not know	121	10.7
<b>Is lower GI bleeding considered a medical emergency?</b>	Agree	895	79.3
	Not Agree	233	20.7

LGIB: Lower Gastrointestinal Bleeding

In general, it was discovered that 58.2% of students knew of lower GI bleeding symptoms, while 41.8% of them were unaware of LGIB symptoms. In terms of knowledge about the causes of LGIB, it was discovered that 52.3% of participants agreed that ischemic colitis is a cause of LGIB (31.3% agreed and 21% strongly agreed). In terms of hemorrhoids, 27.4% of participants agreed and 45.4% strongly agreed that they

could be a cause of LGIB. Furthermore, 56.8% agreed or strongly agreed that diverticulosis is a cause of LGIB, and 65.1% agreed that anal fissures are the cause of LGIB, and 48.2% agreed that rectal ulcers are a cause of LGIB. Additionally, 72 and 65.8%, respectively, believed that colorectal cancer and inflammatory bowel syndrome were the causes of LGIB (**Table. 3**).

**Table.3. Participants' knowledge toward causes of LGIB**

Causes	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
<b>Ischemi ccolitis</b>	24	2.3	90	8.6	135	12.9	327	31.3	219	21.0
<b>Hemorrhoids</b>	8	0.8	43	4.1	93	8.9	286	27.4	474	45.4
<b>Diverticulosis</b>	29	2.8	58	5.6	156	14.9	221	21.1	373	35.7
<b>Anal fissures</b>	25	2.4	58	5.6	128	12.2	283	27.1	397	38.0
<b>Rectal ulcers</b>	21	2.0	39	3.7	136	13.0	346	33.1	332	31.8
<b>Colorectal cancer\ polyps</b>	8	0.8	32	3.1	115	11.0	283	27.1	469	44.9
<b>Inflammator ybowel disease</b>	20	1.9	52	5.0	117	11.2	290	27.8	397	38.0

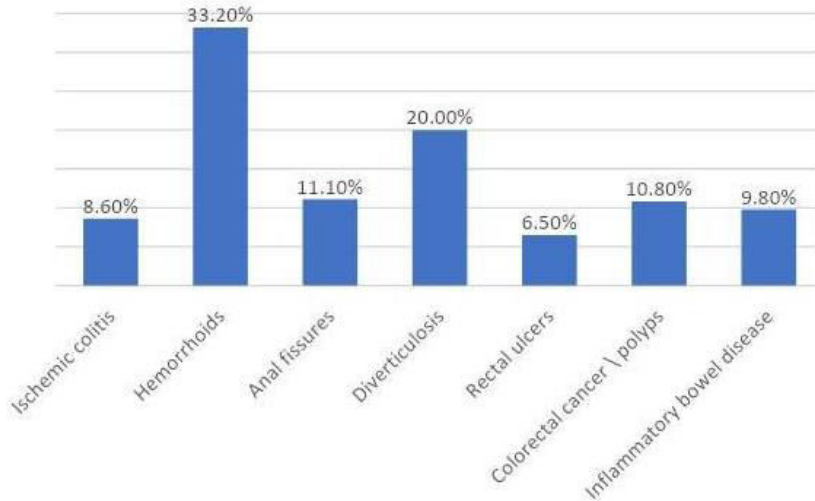
LGIB: Lower Gastrointestinal Bleeding

Furthermore, (**Fig.1**) shows that hemorrhoids (33.2%) are the most common cause of lower GI bleeding, followed by diverticulosis (20.0%), anal fissures (11.1%), and colorectal cancer (10.8%). In terms of the relationship between students'

awareness of LGIB symptoms and their demographic factors, it was discovered that participants' age had a significant impact on their level of awareness ( $P=0.000$ ), with 79.5% of students older than 27 having more awareness as compared to 74.1% of students

aged 24-26, 62.7% of students aged 21-23, and 34.6% of students aged under 20. Furthermore, it was discovered that participants' levels of awareness were unaffected by gender or marital study (P=0.612 and 0.418, respectively).

Additionally, students at IMSIU had the lowest level of awareness, with only 45.6% of them being aware, compared to 66.5% of students at KSU, 68% of students at KSAU-HS, and 69.4% of students at PNU (P=0.000).



**Fig.1. What is the most common cause of lower GIT bleeding according to participants?**

(Table.4) shows that academic years, as well as whether students were in pre-clinical or clinical years, had a significant impact on their awareness, with awareness levels increasing with academic advancement and being in clinical years rather than preclinical years (P=0.000).

campaigns aimed at promoting public awareness about LGIB. Nonetheless, 90.7% of them thought that it was important to raise public awareness and 72.2% were interested in being part of a campaign to raise public awareness of lower GI bleeding.

Furthermore, the data shows that 83.5% of students did not participate in previous

**Table 4. The relation between awareness of students toward symptoms of LGIB and their demographic factors**

Variables		Awareness				P-value
		Unaware	Percentage (%)	Aware	Percentage (%)	
Age	18-20	170	65.4	90	34.6	0.000
	21-23	259	37.3	436	62.7	
	24-26	35	25.9	100	74.1	
	27 or more	8	20.5	31	79.5	
Gender	Male	232	41.1	333	58.9	0.612
	Female	240	42.6	324	57.4	
Marital status:	Single	462	42.0	638	58.0	0.418
	Married	10	34.5	19	65.5	

<b>University</b>	<b>KSAU-HS</b>	73	32.0	155	68.0	0.000
	<b>PNU</b>	59	30.6	134	69.4	
	<b>IMSIU</b>	268	54.4	225	45.6	
	<b>KSU</b>	72	33.5	143	66.5	
<b>Academic year?</b>	<b>First year</b>	80	70.2	34	29.8	0.000
	<b>Second year</b>	104	48.4	111	51.6	
	<b>Third year</b>	144	50.7	140	49.3	
	<b>Fourth year</b>	68	27.6	178	72.4	
	<b>Fifth year</b>	62	29.4	149	70.6	
	<b>Intern</b>	14	23.7	45	76.3	

KSAU-HS: King Saud Bin Abdulaziz University for Health Sciences; PNU: Prince Nourah Bint Abdulrahman University; IMSIU: Imam Mohammad Ibn Saud Islamic University; KSU: King Saud University

(Table.5) shows that lectures, educational websites, and medical books were the primary sources of information for 85.1, 73.8, and 66.3% of students, respectively, when it comes to learning about LGIB, while daily rounds and clinics were helpful for 49.2% of them.

**Table 5. The attitude of students toward promoting public awareness of lower GI bleeding and sources of knowledge**

<b>Have you participated in promoting public awareness regarding lower GI bleeding?</b>	Yes	186	16.5%
	No	942	83.5%
<b>Do you think it is important to promote public awareness in this regard?</b>	Yes	1023	90.7%
	No	105	9.3%
<b>Are you interested to be part of a campaign to promote public awareness of lower GI bleeding?</b>	Yes	814	72.2%
	No	314	27.8%
<b>Source of knowledge</b>	Medical books	656	66.3%
	Medical journals	381	38.5%
	Lectures	842	85.1%
	Educational websites	730	73.8%
	Social media	374	37.8%
	Daily consultant rounds\ clinics	487	49.2%

LGIB: Lower Gastrointestinal Bleeding

## Discussion

Medical students are directly and indirectly exposed to a variety of situations in which their knowledge is vital to raising public awareness of health issues such as lower GI bleeding. As a result, they must have a greater understanding and awareness of such Cases (**Ikhtlaq et al., 2020**). Therefore, the goal of this study was to assess medical students' awareness and knowledge of lower gastrointestinal bleeding etiologies at governmental universities in Riyadh, Saudi Arabia. Gastrointestinal bleeding (GIB) is a common cause of acute hospitalization, with a hospitalization rate of 375 per 100,000 per year in the United States (**Whelan et al., 2010**). GIB is a term that refers to a group of disorders that result in clinical features that are related to gastrointestinal bleeding. One of the most used organizing frameworks in gastrointestinal bleeding (GIB) is the distinction between UGIB and lower gastrointestinal bleeding LGIB.

There are several differences between the two presentations in terms of causes (**Gralnek and Dulai, 2004**). In this study, most of the medical students were aware that there were distinctions between upper GI bleeding and lower GI bleeding. Hematochezia is a typical symptom of lower GI bleeding. Melena can, however, be caused by bleeding in the ascending colon or small intestine (**Zuckerman et al., 1995**). Only 22.2% of participants in this study believed that hematemesis was a symptom of lower GI bleeding. In comparison, 44.3 and 51.1% of students thought melena was a symptom of lower and upper GI bleeding, respectively.

Furthermore, 59.3% knew that hematochezia was a symptom of lower GI bleeding. According to the findings, medical students have a noticeable lack of knowledge about the symptoms of LGIB with at least 21.4% of participants

answering "I do not know" for most of the questions and only 58.2% correctly answering more than half of the questions. Considering the causes of lower GI bleeding, the researchers discovered that the most common causes of lower GI bleeding according to the students were hemorrhoids and diverticulosis.

According to previous research, the pathophysiology of acute lower GI bleeding can be classified as neoplastic, vascular, traumatic, inflammatory, or iatrogenic. Vascular dysplasia or vasodilation, diverticular disease, neoplasms involving colorectal malignancy, colitis containing Inflammatory bowel disease (Crohn's disease and ulcerative colitis), and benign anorectal pathologies like hemorrhoids and anal fissures are all common causes of lower GI bleeding (**Lee and Laberge, 2004; Kim et al., 2014, Adegboyega and Rivadeneira 2020**).

Furthermore, it was discovered that participants' age, academic years, and clinical years of medical school had a significant impact on their awareness of lower GI bleeding, with older participants, clinical years, and higher academic years being associated with a higher level of knowledge. This could be explained by the fact that students are exposed to new information and knowledge of such medical topics over time as part of the educational process, as evidenced by student reports indicating that lectures, educational websites, and medical books were the primary sources of information.

Finally, it was discovered that most participants believed that it was important to raise public awareness of lower GI bleeding, with 72.2% expressing interest in participating in public awareness campaigns. This enthusiasm should be channeled into the creation of new campaigns aimed at raising public awareness of this medical condition. There are some limitations to this



study. One of these limitations is relying on self-reported questionnaires, which could lead to some personal bias, as some students may not give the survey questions the required attention they deserve and may be in a hurry to respond. Furthermore, the study relied on electronic means of distribution, which could lead to sampling bias, such as receiving a higher number of responses from one university than the others, resulting in significant differences in the percentage of participation between the four universities.

### Conclusion

Our study determined that among more than 1000 medical students in the Riyadh region of Saudi Arabia, awareness of the causes and symptoms of lower GI bleeding is insufficient. Additionally, there is a need to raise the awareness of medical students on lower GI bleeding etiologies, particularly those in their pre-clinical years.

### Source of funding

This research received no specific funding from any government, commercial, or non-profit funding agencies.

### Conflict of interest

There are no conflicts of interest to declare for the authors.

### Ethical approval

Ethical approval was granted by Imam Mohammad Ibn Saud Islamic University (IMSIU) Ethical Approval Committee to conduct this study, ethical date is 6/10/2020.

### Authors' contributions

KIA: worked as principal investigator, conceptualization, and study design; developing the data collection tool/questionnaire, data analysis and interpretation; editing, reviewing, drafting, and critically revising the manuscript. AMA, MGA, RMA, SMA, BFA: Literature Search Conception, Design Acquisition Writing the introduction section developing the data collection tool/questionnaire. All authors agreed on the final manuscript.

### Acknowledgment

We are grateful to the students who participated in the research, the data collectors, and Imam Mohammad Ibn Saud Islamic University College of Medicine.

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