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Original Article

Relationship of Body Mass Index (BMI) with the Incidence of Inguinal Hernia

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ABSTRACT

The inguinal wall hernia is the communal hernia of the abdominal wall. It is a communal disorder that affects both males and females from the past long duration. **Objective:** To assess the incidence of unilateral or bilateral inguinal hernia with low body mass index (BMI) and normal BMI subjects. **Methods:** This study was performed in the Surgical unit 1 of Khairpur Medical College and civil Hospital Khairpur Mirs for one-year duration from July 2021 to June 2022. Using an appropriate non-probability sampling technique, this cross-sectional study was held at the surgical unit-1 of Khairpur Medical College and civil Hospital Khairpur Mirs. A total of 90 patients, 80 men and 10 women, were selected for the study. Inclusion criteria were defined as patients over 35 years of age with clinical signs such as reducible swelling in the groin area and clinical signs such as overweight and weight lifting. **Results:** A total of 90 individuals were identified as having an inguinal hernia; their mean age was 26.18± 18.20 years old, and they have 62.78 ± 4.75 inches height. 65.85 ± 5.19 was the patients mean weight and 22.35 ± 3.26 kg/m^2 was the mean BMI. BMI was low in 18 (20%) cases and normal in 72 (80%). **Conclusion:** According to our analysis, a significant number of inguinal hernias on either the right or left side had normal BMIs.

INTRODUCTION

The most frequent hernia of the abdominal wall is the inguinal wall hernia. Approximately, 50% of patients with an inguinal hernia are not aware of their pre-existing problem [1, 2]. The repair of inguinal hernia is the utmost commonly accomplished surgical operations globally [3, 4]. 4% of cases beyond the age of 45 and 1.7% of cases across all age groups typically involve abdominal wall hernias. Inguinal hernias accounts for 78% of reported abdominal hernias, with 4% lifetime risk for women and 28% for males. Inguinal hernia (IG) was a highly widespread condition [5]. Although the precise prevalence of IH is unknown, about 800,000 Americans are diagnosed with it annually, and it is thought that 1 in 2 men will require treatment for an inguinal hernia throughout their lifetimes [6, 7]. Inguinal hernia is thought to be more likely as a result of abdominal pressure, family history, and tissue disease [8]. Another prevalent factor for elevated abdominal pressure is being overweight. Obesity prevents inguinal hernia, despite what might appear reasonable [9, 10]. Obesity is now recognized as a risk factor for inguinal hernia recurrence, however the genesis of an inguinal hernia and its association to body weight are still up for debate [11]. During hernia repair by laparoscopy, the surgeon creates three-minute incisions in the abdominal wall and then abdomen was inflated with non-toxic gas [12]. The laparoscope is directed through the incisions by the surgeon. Body mass index (BMI) and

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inguinal hernia risk associations are still debatable. The study's objective was to evaluate the prevalence of inguinal hernias (IG) across a range of BMI categories.

METHODS

Using an appropriate non-probability sampling technique, this cross-sectional study was held at the Surgical unit-1 of Khairpur Medical College and civil Hospital Khairpur Mirs for one-year duration from July 2021 to June 2022. For this study, ethical approval was attained from the Ethical Committee. Informed consent was obtained from patients and their guardians. 90 total patients, 80 men and 10 women, were selected for the study. The following sample formula was used for calculating the adequate sample size in prevalence study; n = (z)2p(1 - p)/d2 where n is the sample size, z is the statistic corresponding to level of confidence [4]. BMI was calculated using metric or imperial (US) units: Metric units: weight (kilograms) divided by height squared (meters) BMI = Kg/m2. Inclusion criteria; patients over 35 years of age with clinical signs such as reducible swelling in the groin area and clinical signs such as overweight and weight lifting. Exclusion criteria; patients less than 20 years of age with groin pain without swelling were omitted from this analysis. Subjects with BMI> 30 Kg/m2 were not included. The height, age, BMI and weight were recorded in all patients. Less than 18.5 Kg/m2 of BMI was considered low, while 18.5-24.9 Kg/m2 was taken as normal. The percentages and frequencies were determined as qualitative data using the SPSS 20.0 for analysis of the data, while standard deviation and mean were presented as quantitative data.

RESULTS

A total of 90 individuals were identified as having an inguinal hernia; their mean age was 26.18±18.20 years old, and they have 62.78 ± 4.75 inches height. 65.85 ± 5.19 was the patients mean weight and 22.35±3.26 kg/m2 was the mean BMI. There are 10 (11.1%) women and 80 (88.9%) men. 14 (15.6%) people had bilateral inguinal hernias, 38 (42.2%) had right sided inguinal hernias, and 38 (42.2%) had left sided inguinal hernias. This analysis revealed that individuals with a normal BMI had higher risk of inguinal hernia than patients with low BMI (Table 1).

Characteristics	No. (Percentage)
Males	80 (88.9%)
Females	10 (11.1%)
Mean age in years	26.18± 18.20 years
Mean weight in Kg	65.85 ± 5.19
Mean BMI	22.35 ± 3.26
Mean height in inches	62.78 ± 4.75
Right sided Inguinal Hernia	38 (42.2%)
Left sided Inguinal Hernia	38 (42.2%)
Bilateral Inguinal hernia	14 (15.6%)

Table 1: The patient's demographic features

BMI was low in 18 (20%) cases and normal in 72 (80%) (Table 2).

BMI	No. (Percentage)
Normal	72 (80%)
Low	18 (20%)

Table 2: Patient's BMI

Males were 36 (94.7%) in left inguinal hernias (LIH) group, 35 (92.1%) in the right inguinal hernias (RIH) group, and 10 (71.4%) in the bilateral inguinal hernia (BIH) group. However, it was observed that no bilateral inguinal hernia (BIH) was noted in females. There were 3 women (7.9%) in the right inguinal hernia (RIH) group and 2 women (5.3%) in the left inguinal hernia (LIH) group. Table 3 shows BMI was normal in 90 (90%) of the patients with bilateral inguinal hernia group (BIH), 30 (78.9%) of the patients with right inguinal hernia and 28 (73.7%) of the subjects with left inguinal hernia (LIH). BMI was found in low 8(21.1%) and 10 (26.3%) of the patients with right inguinal hernias (RIH) and left inguinal hernias (LIH), respectively but one subject with bilateral inguinal hernias (BIH).

		Right inguinal hernia	Left inguinal hernia	Bilateral Inguinal hernia	p-value
Gender	Males	35(92.1%)	36(94.7%)	10(71.4%)	0.590
	Females	3(7.9%)	2(5.3%)	0	
BMI	Normal	30(78.9%)	28(73.7%)	9(90%)	0.116
	Low	8(21.1%)	10(26.3%)	1(10%)	

Table 3: The incidence of hernia with relation to gender and BMI

DISCUSSION

It is believed that obesity causes inguinal hernias to occur more frequently by increasing intra-abdominal pressure [11, 12]. On the other side, the majority of research indicate that being overweight or obese person's decreases the inguinal hernia incidence [13]. According to Melwani et al., analysis; a one unit rise in BMI (increase 3 kg to 4 kg) reduces the likelihood of having an inguinal hernia by 4% in males aged 47 to 55 [14]. Obese subjects have a 43% lower risk of having an inguinal hernia than people of normal weight. Obesity is regarded as a protective factor for inguinal hernia in adult women as well [15]. Our study is comparable with the previous study. The most extensively used indicator for obesity is BMI. A BMI of 18.5 kg/m2 or less is regarded as underweight; the normal range is seen as 18.5 to 24.99 kg/m2; while a BMI of 30 kg/m2 or higher is regarded as obese [16]. Numerous researches have demonstrated how BMI affects the frequency of inguinal hernias. Patients with normal BMI had a probability of developing a unilateral or bilateral inguinal hernia but our study only looked at people with normal and low BMI. Our study's findings are in line with those of Sangwan et al., who estimated that inguinal hernia incidence in Pakistan was 76.35% [17, 18]. 34 (41.5%) people had bilateral inguinal hernias, 34 (41.5%) had right sided inguinal hernias, and 14

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(17.1%) had left sided inguinal hernias. BMI was low in 18 (17.1%) cases and normal in 72 (82.9%). Risk factors include gender, age, coughing, recurrent pregnancies, constipation, prior operations, weight lifting, obesity, genetic susceptibility, and smoking can cause a hernia to occur [19, 20]. Males were 36 (93.2%) in left inguinal hernias (LIH) group, 35 (93.2%) in the right inguinal hernias (RIH) group, and 10 (71.4%) in the bilateral inguinal hernia (BIH) group. However, it was observed that no bilateral inguinal hernia (BIH) was noted in females. There were 3 women (7.9%) in the right inguinal hernia (RIH) group and 2 women (5.3%) in the left inguinal hernia (LIH) group. Similar findings were made by Albukairi et al., who observed that unilateral hernia was more common than bilateral hernia [21]. He noticed that 18 patients were found to have bilateral hernias. Balram discovered that 63.1% of inguinal hernias occurred on the right side. Similar findings have been reported in other research, however in our investigation, patients with normal BMI were more probable to develop a unilateral right inguinal hernia than a unilateral or bilateral left hernia. According to certain studies, the right testicle's delayed descent may be caused by the right sided inguinal hernia [22]. According to Dietz et al., and Gaebler et al., 15% of women and 85% of males have hernias [23, 24]. Additionally, this study found that men were more probable to have hernias than women, though this change was not significant statistically.

CONCLUSIONS

According to our analysis, a significant number of inguinal hernias on either the right or left side had normal BMIs. Compared to those with a low BMI, individuals with a normal BMI also experience bilateral inguinal hernia. Bilateral hernias occurs less frequently than unilateral ones. According to studies, men are more likely to experience the unilateral inguinal hernias than women who have high incidence of bilateral hernias.

Conflicts of Interest

The authors declare no conflict of interest

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