

## Article

# Demographics, clinical profile, and risk factors of inguinal hernia in elderly males: A hospital based study

Dr. Krupasindhu Pradhan<sup>1</sup>, Dr. Bimal Prasad Sahu<sup>2</sup>, Dr. Purna chandra Pradhan<sup>3</sup> and Dr. Lachhman Bag<sup>4,\*</sup>

- <sup>1</sup> Assistant Professor, Department of Skin and Venereal Disease, Bhima Bhoi Medical College and Hospital, Balangir, Odisha.
  - <sup>2</sup> Assistant Professor, Department of Anesthesiology, SLN Medical College and Hospital, Koraput, Odisha.
  - <sup>3</sup> Assistant Professor, Department of Community Medicine, SLN Medical College and Hospital, Koraput, Odisha.
  - <sup>4</sup> Assistant Professor, Department of General Surgery, PRM Medical College and Hospital, Baripada, Odisha.
- \* Correspondence: lachhmanbag@gmail.com

Received: 6 January 2023; Accepted: 10 May 2023; Published: 25 May 2023.

**Abstract: Background:** In India, the most common elective surgery is inguinal hernia repair, which consumes a significant amount of healthcare resources. This observational study investigates the demographics, clinical profile, and risk factors of inguinal hernia at a tertiary-level institute in northern India.

**Methods:** This observational study was conducted at a tertiary care center in northern India, involving 98 patients attending the surgical outpatient department for inguinal hernia repair. After obtaining informed consent from all participants, demographic information, medical history, and clinical examinations were recorded. This study followed a single-center, prospective, non-randomized observational design.

**Results and Discussion:** In our study, 39 patients (39.8%) were over the age of 50. Ninety-four patients (96%) were male, while four (4%) were female, resulting in a male-to-female ratio of 24:1. The higher prevalence of males can be attributed to their participation in more strenuous exercises, weightlifting, and anatomical differences. Among the identified risk factors, lifting heavy weights accounted for 52% of cases, followed by respiratory disease (37.7%) and altered bowel habits (34.6%). Smoking and diabetes were also found to be associated with an increased risk of hernias. In terms of hernia location, the right side was most common (62.2%), followed by the left side (32.6%), with 5.1% of patients having bilateral hernias. The most common type of hernia observed was the indirect hernia.

**Conclusion:** Inguinal hernia is a common surgical problem, predominantly seen in elderly males. Right-sided inguinal hernias are more prevalent, with the indirect type being the most common. Heavy and strenuous activities were frequently identified as significant risk factors.

**Keywords:** Elderly; Pain; Bowel movement; Etiology; Inguinal hernia.

## 1. Introduction

In India, the most common elective surgery is inguinal hernia repair. Hernias affect between 15% and 20% of the general population. In India, the prevalence of inguinal hernia is estimated to be 1.5 to 2 million [1]. Men are more likely than women to suffer from inguinal hernia. Approximately 90% of inguinal hernia repairs are performed on men, while 70% of femoral hernia repairs are performed on women. The estimated lifetime risk of inguinal hernia in men is 27% and 3% in women [2]. Inguinal hernia prevalence varies with age, with the first peak occurring in the first year of life and the second peak occurring after the fourth decade of life in males [3,4]. Though femoral hernias are the most common in women, inguinal hernias are five times more common than femoral hernias. The indirect inguinal hernia is the most common type of groin hernia in both men and women. In men, the ratio of indirect hernia to direct hernia is 2:1 [3,5].

Classical hernia classification is based on the relationship between the hernia and the surrounding structures and is divided into three categories: indirect, direct, and femoral. Within Hesselbach's triangle, direct hernias protrude medially to the inferior epigastric vessels. Indirect hernias are those that occur lateral to inferior epigastric vessels and pass through the deep ring. Femoral hernias are bulges that protrude through

the femoral ring and are visible lateral to the pubic tubercle. Many other hernia classifications have been proposed; the most commonly used are the Nyhus groyne hernia classification, the European hernia society groyne hernia classification, and Zollinger's unified groyne hernia classification. The most common symptom of an inguinal hernia is a groyne lump that increases when standing and decreases/disappears when lying down. Only a small number of patients have reported groyne pain or discomfort. Extra inguinal symptoms, such as altered bowel habits or urinary symptoms, may occur depending on the contents of the sac.

In surgical emergencies, symptoms include irreducibility, intestinal obstruction, and strangulation of the contents, and should be treated as soon as possible. A history of hernia complications should be ruled out. If there are groyne pain symptoms, a history of reducibility is required [3,5]. Inguinal hernias can appear in children (which is congenital) or later in adults (which is usually considered acquired). The aetiology of congenital hernia has been linked to the persistence of the patent processus vaginalis (PPV). The presence of PPV does not automatically result in an inguinal hernia. Inguinal hernia is predisposed to PPV and other risk factors such as family history, tissue weakness, and strenuous activity [5]. Adult inguinal hernia is multifactorial, influenced by occupational, environmental, and hereditary factors. Obesity, in theory, should have been a high-risk factor for an inguinal hernia. However, studies have shown that the incidence of inguinal hernia is lower in overweight and obese patients [6,7].

This hospital based observational study was conducted on inguinal hernia surgery patients at a tertiary-level institute in northern India. Their clinical profile, demographics, and risk factors were all documented.

## 2. Material and methods

An observational study was carried out at a tertiary care centre in northern India. After obtaining informed consent and demographic information, all study subjects who visited the hospital with complaints of groin swelling with or without pain were included and subjected to surgery. A registered medical practitioner conducted a thorough clinical examination and explained to the patient the importance of privacy and confidentiality. This was a single-centre, prospective, non-randomized observational study in the hospital. The Institute's Institutional Human and Ethical Committee (IHEC) approved the study.

### 2.1. Inclusion criteria

All patients with inguinal hernias went to the surgical outpatient department.

### 2.2. Exclusion criteria

Patients with recurrent inguinal hernia, incarcerated hernia, physical or mental disorders, impaired cognition, daily analgesics for any other illness, refusal to participate in the study, and a history of groyne surgery will be excluded from the study.

Patient information such as name, age, gender, address, socioeconomic status, and occupation were recorded. A thorough history was taken of the presenting complaint as well as the history of the current illness. Comorbidities were recorded. Preoperative groin pain was noted in patients, and their pain was graded on a numerical rating scale of 1 to 10 using the visual analogue score. Pain is classified into four levels based on the VAS scores: Nil = VAS score 0; Mild = VAS score 1-3; Moderate = VAS score 4-6; and Severe = VAS score >6.

### 2.3. Statistical analysis

Descriptive statistics were used, with numbers and percentages used for nominal variables and the mean calculated for numerical variables. The chi-square test was used to examine the relationship between two nominal variables. A p-value of 0.05 or less was considered statistically significant.

## 3. Results

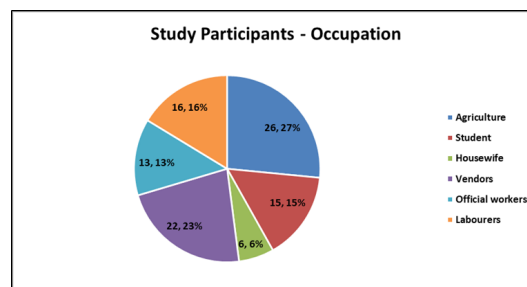
According to the inclusion and exclusion criteria, 98 patients who visited the surgical outpatient department for inguinal hernia repair were included in the study. In our study, seven (7.1%) patients were under the age of 20, twenty (20.41%) patients were between the ages of 21 and 30, thirteen (13.3%) patients were between the ages of 31 and 40, nineteen (19.4%) patients were between the ages of 41 and 50, and thirty-nine

(39.8%) patients were over the age of 50. The average age was  $43 \pm 14$ . Patients in the study ranged in age from 19 to 68 years. Table 1 is depicting the percentage of age distribution among study participants.

**Table 1.** Age distribution of study participants

	Age group (Years)	N	Percentage
1	<20	7	7.1
2	21- 30	20	20.4
3	31-40	13	13.3
4	41- 50	19	19.4
5	50 and above	39	39.8
	Total patients	98	

In this present study, 96% of patients were males and another 4% of patients were females. Male: Female ratio was 24:1. In this study, 26 (27 %) were engaged in agriculture by occupation, 16 (16 %) were students, 6 (6 %) were housewives, 22 (23% were labourers, 13 (13 %) were officers and 16 (16 %) were shopkeepers/vendors. Figure 1 is a pie chart showing the occupation-wise distribution of patients in number and percentage.



**Figure 1.** Occupation-wise distribution of patients

Lifting heavy objects was the most common cause of hernia in 51 (52 percent) of the patients, followed by altered bowel movements; the majority of them had constipation, which was seen in 34 (34.6 percent) of the patients. 37 (37.7%) had diabetes, and 41 (41.8 %) had respiratory problems, primarily chronic obstructive pulmonary disease. Eleven patients (11.2 percent) were alcoholics, and 48 (48.9 percent) were smokers.

The swelling was the clinical presentation in all patients in this current study. 35% of patients experienced groin pain and swelling. The Pearson Chi-Square test revealed that the distribution of patients with pain and swelling was not significant (P value: 0.554). The clinical presentation of an inguinal hernia is shown in Table 2.

**Table 2.** Clinical presentation of Inguinal Hernia

Symptoms	Number of Patients	Percentage
Swelling	98	100
Pain with swelling	36	

#### Pre-Operative Pain VAS Score

Preoperative discomfort The VAS (visual analogue scale) score was mild in 54.2% of patients and moderate in 45.7% of pain patients. The Pearson Chi-Square test revealed that the distribution of patients with pain and swelling was not significant (P value: 0.554). Table 3 shows the number and percentage of patients in each grade of pre-operative pain score VAS.

**Table 3.** Number and percentage of patients in each grade

Pre-operative Pain Score VAS (Visual Analog Scale)	Number of Patients	Percentage
Mild	19	54.2
Moderate	16	45.7
Total	35	

The most common side of hernia in this series was on the right side in 61 patients (62.2 percent), the left side in 32 patients (32.6%), and bilateral in five (5.1%) patients. In 66 (60 percent) of patients, the most common type of hernia was an indirect hernia, followed by a direct hernia in 33 (30 percent), and both in 11 patients (10 percent). Table 4 shows the number of patients with each type of hernia and their percentage.

**Table 4.** Number of patients with each type of hernia

Type of Hernia	Number of patients	Percentage
Indirect	59	60.2
Direct	30	30.6
Both	9	9.1

#### 4. Discussion

The observational study was carried out at a tertiary care centre in northern India; 98 patients were included in the study based on inclusion and exclusion criteria. After obtaining informed consent from all participants, clinical and demographic information was collected. In our study, we had 20 (20.4%) patients between the ages of 21 and 30, 19 (19.4%) patients between the ages of 41 and 50 years, and 39 (39.8%) patients over the age of 50. The average age was  $43 \pm 14$ . This was consistent with a study by de Goede B, which found that people over the age of 50 were the most affected [7].

A similar conclusion was reached by the Ruhl CE study, which found that hernias were more common in middle-aged men aged 40 to 59 [6]. Similarly, Sayanna and Basu found that hernias were more common in older people for more than 50 years [8,9]. The current study included 94 male patients (96 percent) and three female patients (4 percent). The male-to-female ratio was 24:1. Males outnumber females in other studies, such as Burcharth J, who found that inguinal hernias were 90.2 percent males and 9.8 percent females, which matches the findings of the current study [10]. Ruhl et al. also reported similar findings [6]. Lau H et al. also reported that males are prone to have hernias [11].

Hernia pathophysiology is based on the idea of increased abdominal pressure (mechanical effect) affecting a weak abdominal wall [12]. In the current study, the main risk factor was found to be lifting heavy weights and strenuous work in 52 percent of the participants, followed by altered bowel habits in 34.6 percent. Smoking and diabetes were also found to be risk factors for hernias. Similarly, Sharma found that 52.4 percent of patients had hernias as a result of lifting heavy objects in their study [12]. A similar association of risk factors was observed in studies conducted by Constance Erin and Kumar [6,13,14]. In this study, the most common type of hernia was indirect in 60.2% of patients, followed by direct in 30.6%, and both in 9.1% of patients. In addition, in this study, the most common side of hernia was on the right, with 62.2 percent on the right, 32.6 percent on the left, and bilateral in 5.1% of patients. This was also seen in Nordback's study, where out of 469 patients, 207 were right-sided, 146 were left-sided, and 116 were bilateral [15]. Similarly, in the study by Gulzar et al., 64 of 100 patients had right-sided inguinal hernia [16]. Garba ES from Nigeria conducted a survey and discovered that right inguinal hernias were more common than left, with a 1.7:1 ratio. The most common clinical presentation in the current study was swelling. One hundred of the 98 patients presented to the surgical clinic with groin swelling. This is consistent with Jenkins JT's research, which found that groin swelling was the most common clinical presentation [17].

35.7% of patients experienced groin pain and swelling. The pain associated with the swelling was mild in 54.2% of patients and moderate in 45.7% of patients. Page B et al. and others made similar observations, observing mild to moderate pain in patients with inguinal hernia [18–20]. Agriculture was the most common occupation that involved patients in our study, accounting for 27 percent, followed by labourers at 23 percent, students at 16 percent, vendors at 16 percent, official staff at 13 percent, and housewives at 6 percent. Males were found to outnumber females due to their participation in more strenuous exercises, lifting weights, and anatomical differences between the two. The same findings were published in 2015 by Rao G, who found that heavy weight lifting was the most common risk factor among male fishermen [20,21].

The study's limitations can be attributed to the small sample size, which is insufficient to reflect a true picture of the disease. As a result, more multicentric studies with large sample sizes that correlate with aetiological or risk factors are advised. Furthermore, these types of studies should be conducted in different geographical areas so that they can be used in future studies to predict the prevalence of inguinal hernias.

## 5. Conclusion

Inguinal hernia is one of the most common conditions seen in general surgery clinics in male elderly patients. Farmers and labourers were frequently affected, as heavy weight lifting and strenuous exercises are among the most frequently involved risk factors for inguinal hernia. Constipation, respiratory disease (chronic obstructive pulmonary disease), and smoking were also identified as risk factors. The most common clinical manifestation is inguinal swelling. Some of the patients experienced groin pain and swelling. On the VAS, the pain was mild to moderate, and only a few patients required analgesics. Indirect hernias were more common than direct hernias. Right-sided hernias were more common than left-sided hernias, and bilateral inguinal hernias were the least common. Surgery is the only way to treat an inguinal hernia.

**Author Contributions:** All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript.

**Conflicts of Interest:** Authors declare no conflict of interests.

## References

- [1] Lomanto, D., Cheah, W. K., Faylona, J. M., Huang, C. S., Lohsiriwat, D., Maleachi, A., ... & Sutedja, B. (2015). Inguinal hernia repair: Toward A sian guidelines. *Asian journal of endoscopic surgery*, 8(1), 16-23.
- [2] Kingsnorth, A., & LeBlanc, K. (2003). Hernias: inguinal and incisional. *The Lancet*, 362(9395), 1561-1571.
- [3] Agarwal, P. K., Sutrave, T., Kaushal, D., Vidua, R., Malik, R., Maurya, A. P., & Tarun Sr, S. (2023). Comparison of postoperative chronic groin pain after repair of inguinal hernia using nonabsorbable versus absorbable sutures for mesh fixation. *Cureus*, 15(2).
- [4] Abramson, J. H., Gofin, J., Hopp, C., Makler, A., & Epstein, L. M. (1978). The epidemiology of inguinal hernia. A survey in western Jerusalem. *Journal of Epidemiology & Community Health*, 32(1), 59-67.
- [5] Schwartz, S. I., Brunickardi, F. C., Andersen, D. K., Billiar, T. R., Dunn, D. L., Hunter, J. G., ... & Pollock, R. E. (2015). Schwartz's principles of surgery. *McGraw-Hill Education*.
- [6] Ruhl, C. E., & Everhart, J. E. (2007). Risk factors for inguinal hernia among adults in the US population. *American journal of epidemiology*, 165(10), 1154-1161.
- [7] de Goede, B., Timmermans, L., van Kempen, B. J., van Rooij, F. J., Kazemier, G., Lange, J. F., ... & Jeekel, J. (2015). Risk factors for inguinal hernia in middle-aged and elderly men: results from the Rotterdam Study. *Surgery*, 157(3), 540-546.
- [8] Sayanna, S. (2015). Prevalence of inguinal hernia in Indian population: a retrospective study. *Med Pulse Int Med Journal*, 2(2), 75-8.
- [9] Basu, I., Bhoj, S. S., & Mukhopadhyay, A. K. (2013). Retrospective study on prevalence of primary and recurrent inguinal hernia and its repairs in patients admitted to a tertiary care hospital. *Indian Medical Gazette*, 203-13.
- [10] Burcharth, J., Pedersen, M., Bisgaard, T., Pedersen, C., & Rosenberg, J. (2013). Nationwide prevalence of groin hernia repair. *PloS one*, 8(1), e54367. doi:10.1371/journal.pone.0054367.
- [11] Lau, H., Fang, C., Yuen, W. K., & Patil, N. G. (2007). Risk factors for inguinal hernia in adult males: a case-control study. *Surgery*, 141(2), 262-266.
- [12] Sharma, S. B., & Gupta, R. (2020). Prevalence and Risk Factors of Inguinal Hernia: A Study in a Semi-Urban Area. *Journal of Advanced Medical and Dental Sciences Research*, 8(10), 83-86.
- [13] Öberg, S., Andresen, K., & Rosenberg, J. (2017). Etiology of inguinal hernias: a comprehensive review. *Front Surg*. 2017; 4: 52.
- [14] Kumar, B. R. K., Madhusoodhanan, N., Balaji, A., & Poornima, M. A. (2014). Prevalence and risk factors of inguinal hernia: a hospital based observational study. *Int J Med Appl Sc*, 3(4), 191-8.
- [15] Nordback, I. (1984, January). Side incidence of inguinal hernias. In *Annales Chirurgiae et Gynaecologiae (Vol. 73, No. 2, pp. 87-90)*.
- [16] GULZAR, M. R., IQBAL, J., HAQ, M. I. U., & Afzal, M. (2007). Darning vs bassini repair for inguinal hernia: a prospective comparative study. *The Professional Medical Journal*, 14(01), 128-133.
- [17] Jenkins, J. T., & O'dwyer, P. J. (2008). Inguinal hernias. *Bmj*, 336(7638), 269-272.
- [18] Page, B., Paterson, C., Young, D., & O'Dwyer, P. J. (2002). Pain from primary inguinal hernia and the effect of repair on pain. *British journal of surgery*, 89(10), 1315-1318.
- [19] Dabbas, N., Adams, K., Pearson, K., & Royle, G. T. (2011). Frequency of abdominal wall hernias: is classical teaching out of date?. *JRSM short reports*, 2(1), 1-6.

- [20] Rao, G., Rao, A., Pujara, N., Pujara, P., & Patel, S. (2015). Prevalence of hernia among fishermen population in Kutch district. India. *National J Integrated Res Med*, 6(4), 44-51.
- [21] Garba, E. S. (2000). The pattern of adult external abdominal hernias in Zaria. *Nigerian Journal of Surgical Research*, 2(1), 12-15.



© 2023 by the authors; licensee PSRP, Lahore, Pakistan. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).