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Risk factors of inguinal hernia: a one-year retrospective study

Rishi Kant Aryal[1], **Nirmal Thapa**[2], **Prabin Shrestha**[3], **Suresh Maharjan**[4]

[1]Associate Professor, Department of General Surgery, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal
[2]Assistant Professor, Department of General Surgery, Karnali Academy of Health Sciences, Jumla, Nepal
[3]Chief Consultant, Department of General Surgery, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal
[4]Assistant professor, Department of General Surgery, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal

ABSTRACT

Introduction: An inguinal hernia occurs when tissue protrudes from the abdominal cavity through the inguinal canal. While several theories have been proposed regarding their origin, larger datasets on inguinal hernia incidence can help clarify its pathophysiology. This study aimed to identify the various types of inguinal hernias observed at our center and to investigate the associated risk factors.

Methods: This retrospective study included 318 cases of inguinal hernia from February 2024 to February 2025. Complaints recorded were groin swelling with or without pain, family history, lifestyle choices, recurring constipation, bladder issues, and cough. Diagnosis relied on visible groin swelling or a palpable abdominal wall defect.

Results: Out of 318 adult patients, 294 were male and 24 female, with a significant difference ($P < 0.01$). The most common age group was 40–49 years (27% males, 45.74% females), followed by 50–59 years (22% males, 20.83% females). Most patients (58.5%) experienced swelling for less than a year; 7.1% for over two years. There was a significant difference ($p<0.05$): 163 had right-side hernia, 74 left, and 81 both sides. Types included direct (182), indirect (102), and combined (34). Risk factors: heavy lifting (57.23%), improper bowel movements (43.3%), chronic cough (45%), smoking (41.2%), alcohol use (36.1%), straining during urination (33.33%), and coexisting conditions (13.2%). No risk factors were identified in 18%.

Conclusion: In males, especially the right-sided direct type, inguinal hernias are more common than in females. Risk factors include lifting heavy objects, bladder problems, alcohol use, and other health conditions.

Keywords: Bowel disturbances, Heavy weight lifting, Inguinal hernia, Smoking

INTRODUCTION

An inguinal hernia occurs when the contents of the abdominal cavity protrude through the inguinal canal. Repair of an inguinal hernia is the most common operation performed by general surgeons.[1] Among all abdominal hernias, 75% are inguinal hernia. 75% of all abdominal hernias are inguinal hernias. Males are more likely to have them, as they have a 27% lifetime risk of inguinal hernia.[2]

Several etiological risk factors are associated with hernias. Inguinal hernias are most frequently caused by prolonged coughing, constipation, difficulties in micturition, ascites, smoking, heavy lifting, and pregnancy because these conditions raise intra-abdominal pressure. Congenital causes include a family history of inguinal hernia, collagen disorders, connective tissue disorders, and patent processus vaginalis.[2]

It is estimated that 1.7% of people of all ages and 4% of people over 45 have an abdominal wall hernia.[3] The elderly are most at risk for inguinal hernia complications, which include incarceration, intestinal obstruction, and bowel strangulation.[4] Numerous theories have been put out concerning the etiology of inguinal hernias; nevertheless, extensive data on the incidence of inguinal hernias may offer additional insight into the pathogenesis of inguinal hernia development. Pregnancy, obesity, and surgical procedures have been identified as risk factors that frequently contribute to the development of inguinal hernias in females.[5]

The purpose of this study was to identify cases of inguinal hernia and related risk factors within the study group.

METHODS

During the one year from February 2024 to February 2025, all adults who had visited the general surgery outpatient department with primary groin swelling for inguinal hernia repair were included in this retrospective study, conducted at the Department of General Surgery, Unit 2, National Academy of Medical Sciences(NAMS), Bir Hospital. A total of 318 adult patients, including both males and females, were included. Before data collection, institutional review board and NAMS ethical approval were acquired. Written consent was acquired from the patients once they were informed about the study. Name, age, gender, and symptoms of groin swelling with or without pain were among the general details collected. Name, age, gender, and symptoms of groin swelling with or without pain were among the general information collected. The following conditions were noted: obstructive pulmonary disease, diabetes, heavy weight lifting, chronic constipation, bladder

Corresponding Author:
Dr. Rishi Kant Aryal
Email: rishikaryal@gmail.com

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habit, smoking, alcohol consumption, and family history of inguinal hernia, including gender and relation with the family member. Clinically visible groin swelling or a clinically palpable abdominal wall defect in the groin were the criteria used to diagnose an inguinal hernia. The important clinical examination performed by the surgeons was the presence of cough impulse over the swelling, its reducibility, and whether it can be reduced below the swelling. In doubtful cases with other inguinal swellings, an ultrasonogram of the inguinoscrotal region is sought to rule out. Recurrent hernia is not included in this study. The obtained data were entered into an Microsoft Excel worksheet 2018 and SPSS 16 for statistical analysis. When using the chi-squared test, a P value of less than 0.05 was considered statistically significant.

RESULTS

A total of 318 patients were included in the study. Of the total patient included, 294(92.45%) were male and 24(7.55%) were female. There was a significant difference ($p < 0.001$) in the gender-wise presentation of inguinal hernia(Table 1).

Table 1: Sex of the patient who presented with a hernia during the study period(n=318)

Gender	Number	Percentage	p-value
Male	294	92.45%	<0.001
Female	24	7.55%	
Total	318	100%	

The patients presenting with hernias were categorized by age group. Among the patients with hernia, 80(27%) of the male patients and 11(45.84%) female patients were aged between 40-49 years, which was the commonest age group, followed by 50-59 years, with there are 64 (22%) male and 5(20.83%) female. The age-wise distribution is given in Table 2.

Table 2: Age-wise distribution of patients of different genders(n=318)

Age group (years)	Male	Percentage	Female	Percentage
18-29	32	10.9%	2	8.34%
30-39	61	20.7%	3	12.5%
40-49	80	27%	11	45.84%
50-59	64	22%	5	20.83%
60-69	42	14.3%	2	8.3%
>70	15	5.1%	1	4.16%
Total	294		24	

The duration of swelling reported by patients was less than a year for the majority (58.5%), while a few (7.1%) had swelling for more than 2 years (Table 3).

Table 3: Prevalence of duration of swelling among patients presented with hernia(n=318)

Duration of Swelling	Total number	Percentage
<1year	186	58.5%
1-2 years	109	34.27%
>2years	23	7.1%

Based on the side of the hernia, the most common was on the right side, i.e., 163(51.25%), followed by bilateral hernia, i.e., 81(25.47%), and left-sided hernia, i.e., 74(23.27%).

Out of the total cases of hernia 182(57.23%) were direct hernia, 102(32.08%) were indirect hernia and 34(10.69%) were combined hernia.

Multiple risk factors were identified as being associated with inguinal hernia in individual patients. Among those risk factors, heavy weightlifting was found in 182 (57.23%), which is the most common cause, and improper bowel movements, especially straining during defecation, in 138 (43.3%). 143(45%) of patient have history of chronic cough among them 131(41.2%) are smoker, and alcohol intake in 115(36.1%). Forceful or straining during micturition in 106(33.33%), while coexisting morbidity like diabetes, COPD in 42(13.2%), and no risk factors found in 57(18%) study subjects(Table 4).

Table 4: Risk factors associated with an Inguinal hernia among patients presenting with a hernia(n=318)

Risk factor	Number	Percentage
Family history	62	19.5%
Straining during defaecation	138	43.3%
Smoking	131	41.2%
Chronic cough	143	45%
Forceful micurition	106	33.33%
Heavyweight lifting	182	57.23%
Alcohol intake	115	36.1%
Co-existing morbidities	42	13.2%
Unknown	57	18%

DISCUSSION

Elective surgery is recommended for the inguinal hernia condition, as there is no medical treatment. The hernia truss is considered in cases of operative conditions due to old age and other severe comorbid conditions, for which we refer almost none or very few. Because the pads in older designs do not stay in permanent contact with the hernia, they are unable to properly confine the hernia at all times. The more modern variety of truss is made with non-intrusive flat pads and comes with a guarantee to hold the hernia securely during all activities.[6]

In our study, out of 318 patients, males comprised 294 (92.45%) and females comprised 24 (7.55%). Maximum number of cases were observed in age group 40-49 years which had 80 males and 11 females and 50-59 years had 64 males and five females followed by 30-39years had 61 males and three females, adults upto 29 yrs years had 32 males and two females 60-69 years had 42 males and two female whereas above 70 there were 15 male and one female. This is similar to the study by Basu et al.[7] Our analysis revealed that 163 patients had involvement on the right side, 74 on the left, and 81 on both sides. These findings were similar to those of a study by Gulzar et al.[8] It was claimed that the right side preponderance was caused by the testis's late descent and the right processus vaginalis's more frequent failure to close.[9,10]

In our study, 58.5% of patients experienced swelling for less than a year before seeking medical attention, which is consistent with the findings of Kumar et al.[11] till the pain or discomfort limits their daily activity. In most cases, the hernia is reducible, meaning it can be pushed back into the abdomen when lying down or applying pressure to it. On-duty surgeons operate on irreducible or obstructive hernias present in the emergency department.

Varieties of inguinal hernia, i.e., direct, indirect, or combined, are observed during the study period. Direct type is the commonest type, which is in agreement with Ruhl et al.[12]

The common risk factors associated with these conditions were heavy object uplift (57.23%), chronic cough (45%), straining during defecation (43.35%), alcohol intake (36.1%), forceful micturition (33.33%), and unknown causes (18%), as found in the study by Nordback et al.[13] A positive family history was another significant factor contributing to the occurrence of hernias in 19.5% of cases. Others, including Lau et al. and Junge et al., agreed with this and also anticipated that a hernia would occur if a family member had a history of one.[14,15]

CONCLUSION

Males are more likely than females to have an inguinal hernia, with the direct type being the most prevalent kind in the middle-aged group of 40 to 49 years. Major risk factors are bowel and bladder disturbances, smoking, cough, lifting heavy objects, intake of alcohol, etc. The right side is more likely to be affected in our study, and most patients presented with swelling within a year. To be useful for future research in predicting the prevalence and risk factors associated with inguinal hernias, studies of this kind should be conducted in various geographic locations.

DECLARATION

Author Contributions

RKA was involved in the Concept of research, Design of research, Literature search, Data collection, Data analysis, and Data Interpretation. NT, PS, and MS Drafted and reviewed the manuscript for important intellectual content. PS and MS were involved in the final approval of the version submitted. All authors gave their agreement to be accountable for all aspects of the work.

Ethical Approval

This research was approved by the IRC of the National Academy of Medical Sciences with the reference number 1495/2082 on May 19, 2025.

Consent/Assent

Written consent was obtained from all participants prior to data collection.

Data Availability Statement

The data supporting the findings of this study are presented within the article. Full data will be available to the editorial team on request.

Conflict of Interest

NT is a member of the editorial board of the JKAHS. He has not been involved in any of the editorial processes of the article.

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