

# Study of Risk Factors in Patients of Primary Inguinal Hernia in Bundelkhand Region of India.

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## ABSTRACT

**Background:** Inguinal hernia is a common condition dealt by surgeons in our country. It is said to be associated with increasing age, male gender, smoking, heavy weight lifting, abdominal wall weakness, connective tissue disorders and factors responsible for increased intra-abdominal pressure. Present study has been carried to find out relation of various risk factors associated with development of inguinal hernia in both gender, various age groups and its association with type of inguinal hernia in Bundelkhand region of India. **Methods:** This study was carried out on patients of primary inguinal hernia belonging to Bundelkhand region of India. Patients' detailed history was taken for the presence of risk factors and they were thoroughly examined for other comorbidities too. Data were further classified in groups formed on the basis of patient age, gender, type of inguinal hernia viz. direct/ indirect hernia and presence of various risk factors. All the findings were tabulated and inferences were drawn followed by statistical comparison using chi-square test with p value <0.05 considered as significant. Relative risk for cases with controls were estimated by calculating the odds ratio (OR) with 95% confidence intervals by univariate logistic regression. **Results:** In both gender, age group of 41-50 years had highest number of patients followed by age group of 31-40 years. Among 170 patients of primary inguinal hernia, males showed higher preponderance for direct as well as for indirect inguinal hernia than females. Inguinal hernia prevalence was higher on right side than left side in both gender. Most prevalent risk factors found present in our study group were heavy weight lifting (35.29%, OR=1.77), chronic cough (21.67%, OR=2.88), bowel disturbances (20.58%, OR=1.83) and tobacco use (20.58%, OR=1.94). **Conclusion:** Inguinal hernias continue to be a source of morbidity and mortality in our country and globally. Its prevalence increases with advancing age in both gender and mostly on right side. Present study also shows that heavy weight lifting, chronic cough, bowel disturbances and tobacco use are associated with high occurrence of inguinal hernia among the genders and different age groups.

**Keywords:** Inguinal Hernia, primary inguinal hernia, risk factor, direct inguinal hernia, indirect inguinal hernia

## INTRODUCTION

A hernia is the protrusion of any organ, structure or portion thereof through its normal anatomic confines. In the abdominal wall, a hernia is the protrusion of all or part of any intraabdominal structure through any congenital, acquired or iatrogenic defect.<sup>[1]</sup> An inguinal hernia is protrusion of abdominal cavity contents through inguinal canal.<sup>[2]</sup> It is one of most common type of hernia. It is said to be often associated with increasing age, male gender, smoking, connective tissue disorder and factors responsible for increased intraabdominal pressure.<sup>[3]</sup>

Present study has been carried to find out relation of various risk factors with development of inguinal hernia in both gender, various age groups and its association with type of inguinal hernia in Bundelkhand region of India.

## MATERIALS AND METHODS

This study was done only on patients of Bundelkhand region of India, suffering from primary inguinal hernia presented in Department of surgery, Rajkiya Medical College, Jalaun, Uttar Pradesh and Ambe Nursing Home, Orai (Jalaun), Uttar Pradesh on 170 patients (130 male and 40 female patients) over a period of evaluation from October 2014 to February 2018. Patients belonging to other regions were not included in this study. Patients showing recurrence of inguinal hernia were also excluded from the study. A prior approval was taken for this study from research ethical society of the institute. A very detailed history taking and thorough examination of all the patients were done.

Among the risk factors we seek out for family history of inguinal hernia, chronic constipation/ other Bowel disturbances, heavy work / weight lifting, Tobacco use {smoker/ oral}, Chronic alcohol use, Chronic coughing {chronic bronchitis, COPD, asthma etc.}, Bladder disturbances (Prostatic hyperplasia/ UTI etc.), Diabetes mellitus, Hypertension, Morbid obesity (BMI  $\geq 35$ ),

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Pregnancy, Ascites, Abdominal wall weakness due to previous surgery & connective tissue disorder.

An age and gender matched control group was also formed by random selection from general outpatient clinic, who were patients other than inguinal hernia. Data were further classified in groups formed on the basis of patient age, gender, type of inguinal hernia viz. direct/ indirect hernia and presence of various risk factors. All the findings were tabulated and

inferences were drawn followed by statistical comparison with the help of "Statistical Calculator v 4.0" using chi-square test with p value <0.05 considered as significant. Relative risk for cases with controls were estimated by calculating the odds ratio with 95% confidence intervals by using "Medcalc statistical software".

## RESULTS

**Table 1: Distribution of patients on the basis of age group, gender and type of inguinal hernia**

	Direct inguinal hernia		Indirect inguinal hernia		Direct + indirect inguinal hernia	
	Male	Female	Male	Female	Male	Female
Age of patients in years						
≤10	1	0	3	0	4	0
11-20	1	0	6	3	7	3
21-30	3	2	6	4	9	6
31-40	7	3	23	10	30	13
41-50	12	2	34	14	46	16
51-60	10	0	14	2	24	2
61-70	2	0	6	0	8	0
≥70	0	0	2	0	2	0
Chi square test	X <sup>2</sup> = 6.2 df= 6 p= 0.4		X <sup>2</sup> = 7.2 df= 7 p= 0.4		X <sup>2</sup> = 11.68 df= 7 p= 0.1	

**Table 2: Distribution of patients on the basis of laterality of hernia, gender and type of inguinal hernia.**

	Direct inguinal hernia		Indirect inguinal hernia		Direct + indirect inguinal hernia	
	Male	Female	Male	Female	Male	Female
Age of patients in years						
Right	24	5	66	21	90	26
Left	10	2	24	11	34	13
Bilateral	2	0	4	1	6	1
Chi square test	X <sup>2</sup> = 0.4 df= 2 p= 0.81		X <sup>2</sup> = 0.79 df= 2 p= 0.68		X <sup>2</sup> = 0.86 df= 2 p= 0.65	

**Table 3: Risk factors for primary inguinal hernia.**

S. No.	Risk factors	Male patients (130)	Female patients (40)	Total patients (170)	Odds ratio	95% confidence intervals	P value
1	Family history	4	1	5	-	-	-
2	Chronic constipation/ other Bowel disturbances	20	11	31	1.83	1.02-3.31	0.04
3	Heavy work / weight lifting	53	7	60	1.77	1.1-2.84	0.01
4	Tobacco use {smoker/ oral}	34	1	35	1.94	1.07-3.53	0.02
5	Chronic alcohol use	12	0	12	0.53	0.25-1.1	0.1
6	Chronic coughing {chronic bronchitis, COPD etc.}	32	5	37	2.08	1.15-3.77	0.01
7	Bladder disturbances (Prostatic hyperplasia/ UTI etc.)	4	0	4	-	-	-
8	Diabetes mellitus	11	4	15	0.68	0.33-1.38	0.28
9	Hypertension	19	7	26	0.69	0.39-1.21	0.2
10	Morbid obesity (BMI ≥35)	12	7	19	0.52	0.3-1.04	0.06
11	Pregnancy	0	0	0	-	-	-
12	Ascites	5	0	5	0.48	0.16-1.44	0.19
13	Abdominal wall weakness due to previous surgery	3	4	7	0.68	0.25-1.84	0.45
14	connective tissue disorder	1	0	1	-	-	-

p value <0.05 considered as significant.

## DISCUSSION

In the present study, most of the patients belonged to age group of 41-50 years followed by 31-40 years age group in both gender. [Table 1] We found that inguinal hernia is more commonly seen with increasing age consistent with findings of other workers.<sup>[3-7]</sup> Out of 170 patients of inguinal hernia, 76.47% were males. [Table 1,2] Inguinal hernia is most common hernia in males and females, but much more common in males.<sup>[8]</sup> Similar findings have also been noted in various other studies conducted by workers in different parts of world.<sup>[3-5,7,9]</sup> Regarding laterality of inguinal hernia in present study, we noted that inguinal hernia prevalence was higher on right side than left side in both gender. [Table 2] It is said that failure of closure of right processus vaginalis is more common, that is why right sided inguinal hernia are commoner.<sup>[10,11]</sup> Right sided preponderance of inguinal hernia is also noted in various other studies conducted by workers in different parts of world.<sup>[7,12-16]</sup>

Most prevalent risk factor which was present in our study group was heavy weight lifting (35.29%). This risk factor was present because of their occupation as most of the patients were laborers, farmers or factory workers. Routine heavy work leads to increased intraabdominal pressure leading to development of inguinal hernia. Strenuous labour work and lifting weights were also found as a risk factor for inguinal hernia by other workers.<sup>[4,17,18]</sup>

Other prevalent risk factors for developing inguinal hernia in our study group were chronic cough, bowel disturbances and tobacco use. 21.76% patients of inguinal hernia gave history of chronic cough. The common causes of chronic cough included COPD, TB, asthma, chronic bronchitis etc. 20.58% patients of inguinal hernia had complaint of bowel disturbances and most of the them gave history of chronic constipation. Constipation is also found a risk factor in other studies too.<sup>[4,17,18]</sup> Straining during defecation in squatting position tends to push abdominal viscera towards inguinal and pelvic region. Coughing as well as straining during defecation both cause increase in intraabdominal pressure also. Hence they pose as a risk factor for developing hernia.

20.58% patients of inguinal hernia had history of chronic tobacco use esp. smoking bidi and chewing khaini. Smoking may adversely affect connective tissue metabolism<sup>3</sup>. In chronic smokers, muscles get weakened which may further increase risk for developing inguinal hernias.<sup>[4]</sup>

Less prevalent risk factors in our study group were hypertension (15.29%), morbid obesity (11.17%), diabetes mellitus (8.8%), chronic alcoholism (7.06%), abdominal wall weakness due to previous surgery (4.12%), ascites (2.94%) and urinary bladder disturbances (2.35%). 88.8% of inguinal hernia patients in present study had normal built and

11.17% were morbid obese. Obesity is not a risk factor for developing inguinal hernia as reported in various other studies also.<sup>[3,4,17,19,20-22]</sup> One hypothesis for this phenomenon is that the intraabdominal visceral fat prevents hernia from occurring. In our study there was no pregnant female. Only 2.94% patients had family history of groin hernia, out of which 1 patient had signs of connective tissue disorder.

## CONCLUSION

Inguinal hernias continue to be a source of morbidity and mortality in our country and globally. Its prevalence increases with advancing age in both gender and mostly on right side. Present study also shows that heavy weight lifting, chronic cough, bowel disturbances and tobacco use are associated with high occurrence of inguinal hernia among the genders and different age groups.

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