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## Evaluation of clinico-epidemiological profile and associated risk factors of inguinal hernia. A Prospective observational study

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### Abstract

**Background:** Inguinal hernia repair is a commonly performed general surgical procedure that constitute more than 95% of all groin hernia repairs. However, in developing countries, quite a considerable percentage of it is not repaired or delayed repaired and that lead to a higher incidence of morbidity and mortality. so, we planned to conduct this study to understand the clinic-epidemiologic profile of inguinal hernia in a tertiary care hospital of Bangladesh.

**Objective:** To evaluate the clinical, epidemiological profile and associated risk factors for inguinal hernia.

**Methodology:** This observational study was conducted among 100 patients during January 2018 to January 2019 who admitted in the surgery department of a tertiary care center for inguinal hernia surgery. All the study subjects were examined and their clinical and epidemiological profiles studied, tabulated and analyzed.

**Result:** Among the 100 patients, most of them (94%) were men with a age of  $57.02 \pm 12.87$ , farmer (36%) by occupation. 61% patients were in low socio-economic status. Most of the patients (60%) were in the age group of 40-60 years followed by less than 30 years (21%). On query regarding symptoms of inguinal hernia, all of them (100%) complaints of groin swelling. More than half of the patients complaints of groin pain and sensation of heaviness in groin. On clinical examination, right sided, left sided, bilateral hernias were found in 49%, 45% and 6% study patients respectively. Direct hernias, indirect, pantaloon hernias were seen in 57%, 30%, 7% study patient respectively. Most of hernias (81%) were reducible and were incomplete (88%). Most of the patients (75%) presented late to the health care center due to the lack of awareness of the disease and were initially treated by homeopath medicine. During query about risk factors for inguinal hernia, 46% patients were more than 50 years of age and 26% patients were smoker. In this study, most common hernia repair procedure was Lichtenstein's procedure (63%) followed by modified Bassini's procedure (11%). Total open procedure were 93% and laparoscopic hernia repairs were done only in 7% patients.

**Keywords:** Inguinal hernia, epidemiology, risk factors

### 1. Introduction

Hernia is a Latin term that is defined as an "abnormal protrusion of a viscus or part of a viscus through a normal or abnormal opening in the wall of its containing cavity". Still now inguinal hernia repair is second most common general surgical operations worldwide that account for about 10-15% of all surgical procedures [7, 17]. It is very common in men with lifetime risk of 27% and 3% for women, thus 1 in 4 men has the risk of developing the condition. and incidence increase with increase of age in man [2, 7]. Though exact data of hernia surgery in Bangladesh is unavailable, but with the average global incidence of hernia surgery being 3 per 1000 population yearly [4], Bangladesh with a population of 180 million where more than half million hernia surgeries performed every year. Very often hernia as a disease is ignored specially underdeveloped and developing countries as they may remain asymptomatic for prolonged periods, the severity of the condition is often overlooked and ultimately it results higher mortality as high as 7% in emergency surgeries [1, 7, 17].

World health organization (2002) reported that inguinal hernias are sources of social stigma [4, 7].

It lower the chances for employment, create sexual problems, physical deformation, loss of work, low self-esteem or confidence [3, 5, 7] People who are living with victims of inguinal hernia were reported to have not only poor health-seeking behavior but also they were negligent about their conditions, ignorant about the life threatening side effects or complications associated with their conditions. Sometimes cultural, educational factors and economic constraints may prevent the realization of illness and suppress proper utilization of available health services. So, in developing countries, quite a considerable percentage of inguinal hernia is not repaired that leads to a higher incidence of morbidity and mortality.

Inguinal hernias may be congenital or acquired [7] Several hypotheses regarding the etiology of inguinal hernia have been proposed. In male increased abdominal pressure, preexisting abdominal muscles weakness, constipation, prostatism, chronic cough, heavy weight lifting, obesity, smoking, aging, pelvic fractures and trauma, connective tissue diseases, and systemic illnesses and in females, obesity, pregnancy, and operative procedures have been proposed and well-known risk factors that commonly contribute to the formation of inguinal hernia.

In Bangladesh, there is insufficient published data on the clinical and epidemiological

profile of patients presenting with inguinal hernia and this study may provide further understanding to the pathophysiology of inguinal hernia development and may estimate the prevalence, age and gender differences, risk factors associated with the inguinal hernia development. Available data may increase the awareness and knowledge of health care provider regarding inguinal hernia and may help to reduce the burden of hernia in Bangladesh.

## 2. Material and methods

During January 2018 to January 2019, this prospective study was conducted among 100 patient who were clinically diagnosed as

primary inguinal hernia and admitted in the surgery department of Holy Family Red Crescent Medical College Hospital, Dhaka for surgery. Necessary particulars regarding relevant history, demographic facts, risk factors, clinical data and examination findings, operation theatre logs data were recorded in a questionnaire, then, tabulated and analysed by SPSS (version 24.0) software. Statistical methods were used in data analysis, yielding quantitative results. Outcome of surgery was not a parameter of assessment.

### 2.1. Inclusion criteria

- Patients's age >18 years having primary inguinal hernia.
  - Only elective cases were included.
- Those who willingly gave informed consent.

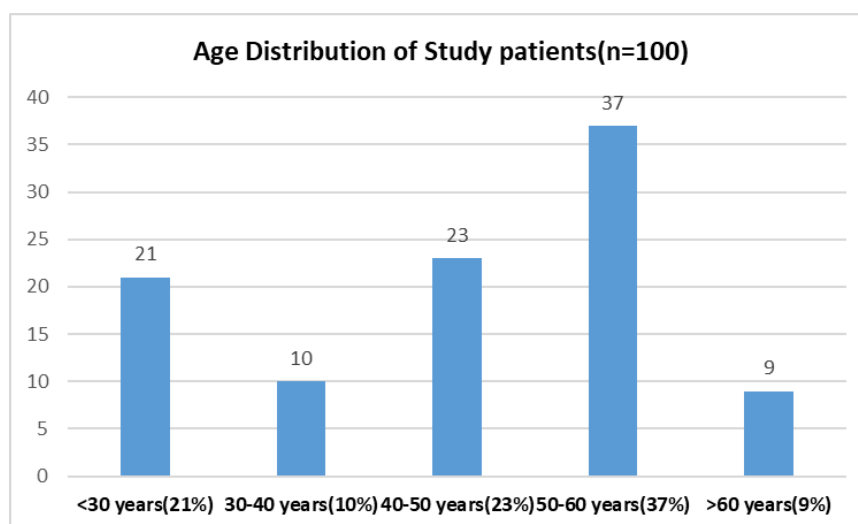
### 2.2. Exclusion criteria

- Patient's age < 18 years.
- Recurrent hernias.
- Patients previously operated for contralateral inguinal hernia.
- History of surgery for any groin or ventral hernia in the past.
- Patients being simultaneously operated for coexisting other surgical conditions including ventral hernias were excluded.

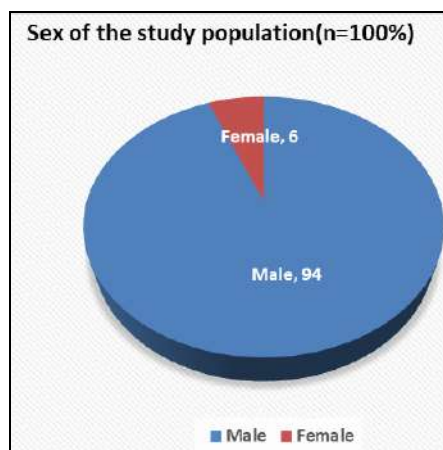
Ethical approval was obtained from the Institutional Ethic Review Committee before the commencement of the study. A well informed written consent was taken from each patient prior to being enrolled into this study.

## 3. Results

Total 100 patients were enrolled in this study, mean age was  $57.5 \pm 11.26$  years and the majority (60%) patients belonged to the 40-60 years. Increasing incidence noted in early age and in old age (Figure 1). Among 100 patients, 94 were male and only 6 patient were female (Figure 2).

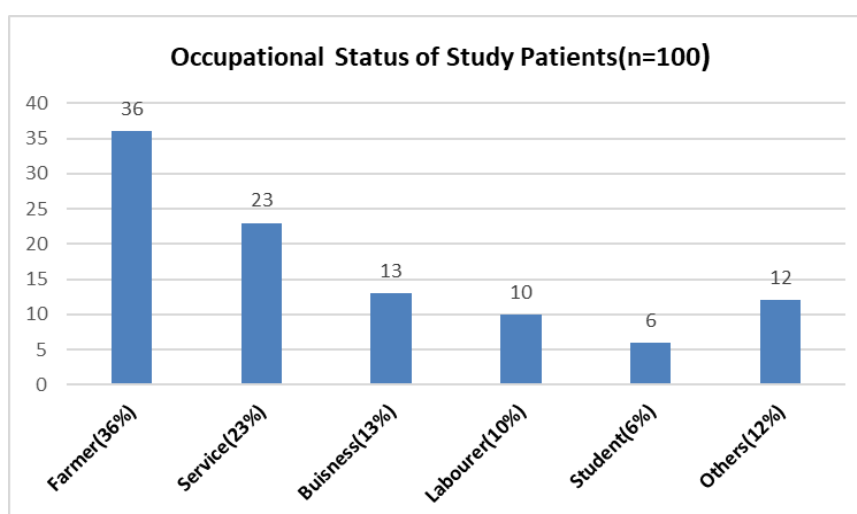


**Fig 1:** Bar diagram showing the age of the study patients.



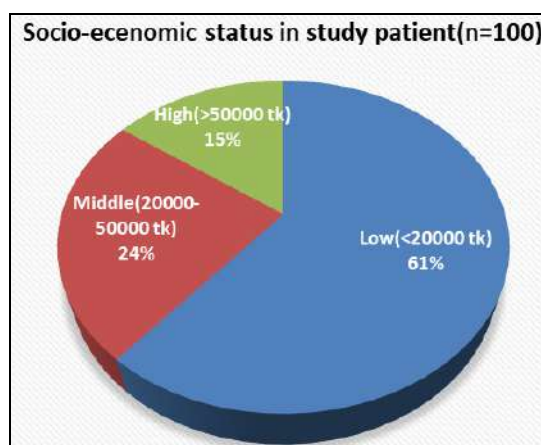
**Fig 2:** Pie diagram showing the sex of the study patients.

leading profession was cultivation (36%), while 23% the patients were servicemen. Business was profession for about 13% patients. Labor and student were other notable profession. (Figure 3)



**Fig 3:** Bar diagram showing the occupational status of the study patients.

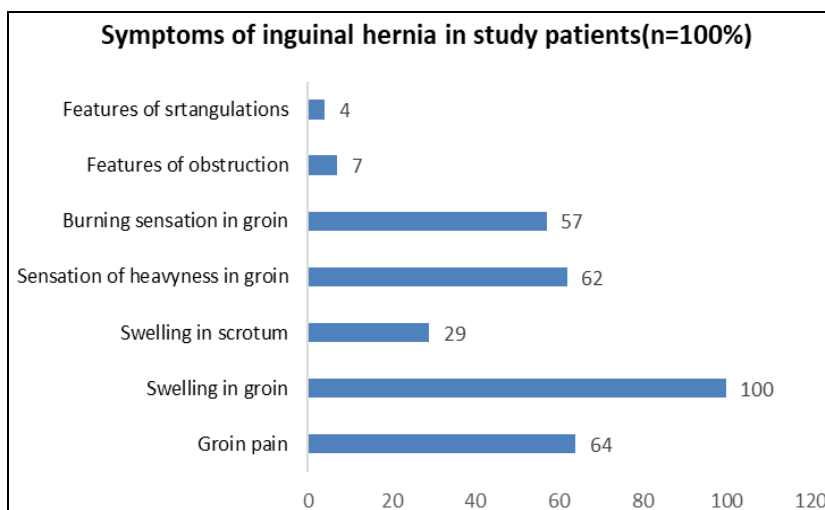
In this study, 61% patients were in low socio-economic status, 24% and 15% were in middle and higher socio-economic categories respectively (figure 4).



**Fig 4:** Bar diagram showing socio-economic status in patients.

On query, regarding symptoms of inguinal hernia, all of them (100%) complaints of groin swelling. Groin pain, sensation of heaviness in groin, burning sensation in groin, swelling in

scrotum, features of obstruction features of strangulation noted in 64%, 62, 57%, 29%, 7%, 4% respectively. (Figure 5)



**Fig 5:** Bar diagram showing distribution of various symptoms observed in patients.

Among 100 study patients in 41 patients duration of symptoms were more than 12 months. Mean duration  $8.03 \pm 8.15$  months (Table 1)

**Table 1:** Duration of symptoms in the study populations.

Duration of swelling	No of patients	Percentage (%)
0-3 months	28	28%
3-6 months	13	13%
6-12 months	18	18%
>12 months	41	41%

Total	100	100%
Mean duration	$8.03 \pm 8.15$	

Most of the patients (41%) presented late to the hospital due to lack of awareness of the disease.

24% patients had financial constraints. 34%, 19% treated by homeopath medicine and traditional healer respectively. 23% reluctant to treatment due to fear of surgery. (Table 2)

**Table 2:** Reasons for late presentation to health care centre.

Reasons for late presentation (the percentages will not add up to 100 as each patient had multiple reasons)	No of patients(n=100)	Percentage (%)
<b>Financial constraints</b>		
Present	24	24%
<b>Lack of awareness of disease</b>		
present	41	41%
<b>Fear of surgery</b>		
present	23	23%
<b>Long distance from health care facilities</b>		
Present	17	17%
<b>Treated by traditional healer</b>		
Present	19	19%
<b>Treated by homeopath medicine</b>		
present	34	34%
<b>No reasons reported</b>		
present	9	9%
<b>Others</b>		
Present	7	7%

On clinical examination, right sided, left sided, bilateral hernias were found in 49%, 45% and 6% study patients respectively. Direct hernias, indirect pantaloon hernias seen were in 57%, 30%, 7% study patient respectively. 81% hernia was reducible and 88% was incomplete (Table 3).

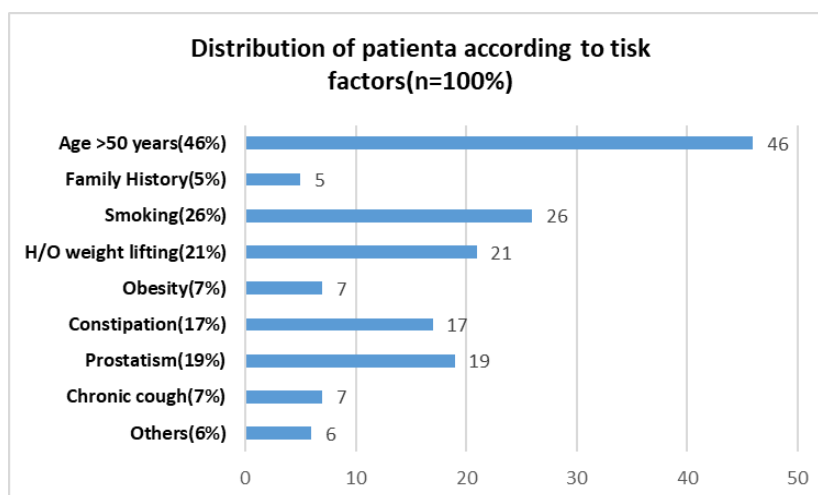
**Table 3:** Clinical examination in our study population.

Type of Hernia	No of Patients(n=100)	Percentage (%)
Right direct	33	31%
Right indirect	11	11%
Right pantaloon	5	05%
Left direct	24	26%
Left indirect	19	19%
Left Pantaloon	2	02%

Bilateral	6	06%
Total	100	100%
Reducibility	No of patients	Percentage (%)
Reducible	81	81%
Irreducible	19	19%
Total	100	100%
Complete or incomplete	No of patients	Percentage (%)
Complete	22	22%
Incomplete	88	88%
Total	100	100%

During query about risk factors for inguinal hernia, 46% patients were more than 50 years. 26% patients were smoker. History of prostatism, 1 lifting heavy weights lifting, constipation, obesity, chronic cough were seen in 19%, 21%, 17%, 7%, 7% study

patients respectively. (Figure 6).



**Fig 6:** Bar diagram showing distribution of patients according to risk factors present.

Most common hernia repair procedure were Lichtenstein's procedure in (63%) patients followed by modified Bassini's procedure in 11% patients. Total open procedure were 93% and

laparoscopic hernia repairs were done only in 7 patients. (Table 4)

**Table 4:** Different surgical procedure done in study population.

Operative procedure done	No of Patients (n=100%)	Percentage (%)
Open procedure		93%
Lichtenstein's procedure	63	
Modified Bassini's procedure	11	
Deserda repair	3	
Meshplug repair	5	
Darn repair	6	
Shouldice repair	5	
Laparoscopic procedure	7	7%
Total	100	100%

#### 4. Discussion

Among the 100 patients, most of them (94%) were men with a mean age of  $57.02 \pm 12.87$  years that coincides with other studies [4, 8, 11]. However, studying the distribution of age, most of the patients (60%) in this study were in the age group of 40-60 years followed by less than 30 years (21%). This type of bimodal peaking was found among the elderly and the young in some other studies also [4, 6, 8]. Due to increased incidence of inguinal hernia in this productive age group of 40-60 years, it becomes a burden on the economy of the country by increasing the morbidity.

Inguinal hernias are reported to be more common in low socioeconomic strata [2-4, 7, 12, 15-19]. It is reflected very well in this study where most of the patients (61%) were in low socioeconomic status, 24% and 15% were in middle and higher socioeconomic categories respectively.

In this study, right inguinal hernias were more common than left, ratio 1.08:1 and only 6% cases were bilateral which correlates with study done by Mukesh sangwan [8] *et al.* showed 1.45:1 and with also some other studies [7, 5, 17]. In our study, direct hernias, indirect pantaloon hernias seen were in 57%, 30%, 7% study patient respectively and the present study correlated well with Burcharth *et al.* [4].

In our study population, older age (50%) and smoking (39%) were the most common risk factors present. History of prostatism (19%), heavy weightlifting (21%), constipation (17%) were the other common risk factors for the development of inguinal hernia in our study (Figure 5) that correlates with study

of Robindera Kour *et al.* [10] and some other studies [3, 5, 7]. Smoking was established as an independent risk factor for hernia development with Malviya *et al.* [11] reporting 30.6% 10 of their study. Family history however appears to be an independent risk factor in the etiopathogenesis [10, 15, 16] but in this study only 5% study population had positive family history.

A study in USA conducted by Constance *et al.* [9] found that the inguinal hernia was associated with older age, chronic cough, obesity, greater height, rural residence and it was supported by many other studies like Lau H *et al.* [6] and Junge K *et al.* [5], which showed that family history is an important predictor for development of inguinal hernias and as well as recurrent hernia. The other risk factors suggested were chronic cough, Prostatic hypertrophy, chronic constipation, Chronic Diabetes [7, 14, 16, 17, 19]. In this study, Lump (100%) and pain (64%) were the most common presenting symptoms that correlates with some other studies [2-3, 6-7, 10]. (Figure-4) Duration of symptoms at presentation in our study was  $5.02 \pm 8.19$  months and 59% study patients presented to hospital after 6 months of their developing symptoms. (Table 3) In our study, most of the patients of inguinal hernia presented late to health care provider which is similar to the scenario in other developing countries [8, 11, 12]. Most of the patients (41%) presented late to the hospital due to lack of awareness of the disease, 24% patients had financial constraints. 34%, 19% treated by treated by homeopath medicine and traditional healer respectively. 23% patient reluctant to treatment due to fear of surgery. (Table 2)

During searching of operation theatre logs we recorded that open

procedure were done in 93% patients and laparoscopic hernia repairs were done only in 7 patients among total 100 study patients. (Table 4) Among open procedure most common hernia repair procedure was Lichtenstein's procedure in 63% patients followed by modified Bassini's procedure in 11% patients compared to laparoscopic repair (7%). It suggest that still Lichtenstein's repair is till surgeon's first choice in developing countries may be due to financial contrains.

## 5. Conclusion

In this study, we found that male are more affected than female. Right sided and direct hernia is more common. Most of the patients from low socio-economic condition and main risk factors are old age, smoking, lifting heavy objects, prostatism and constipation. Lack of awareness of the disease, financial constraints, fear of surgery, treatment by homeopath medicine and traditional healer are common causes for late presentation to health care providers that increase morbidity and mortality. Most common hernia repair procedure were Lichtenstein's procedure.

## 6. Author's contribution

Kabir ASMA: Evaluation and optimization of all patients with comorbid conditions, script writer and compilation of results.

Sharmin M, Akhter K, Alam MS: Review of script and data entry, analysis.

SW: Data entry. RS, AAK: Evaluation and optimization of all patients with comorbid conditions.

MI: Data entry and review of article.

Alam MS, Ahmed, I Alam MS, Haque MF: Provided expert clinical opinion.

All authors edited and approved the manuscript prior to submission.

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## 8. Funding: No funding sources.

## 9. Conflict of interest

The authors have no financial interests to disclose.

## 10. Disclosures

All authors have nothing to disclose.

## 11. Ethical approval

The study was approved by the Institutional Ethics Committee of Holy Family Red Crescent Medical College.

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