e-ISSN: 0975-9506, p-ISSN: 2961-6093
Available online on www.ijpqa.com doi: 10.25258/ijpqa.16.2.109
International Journal of Pharmaceutical Quality Assurance 2025; 16(2); 702-708
Original Research Article

Demographic and Clinical Characteristics of Patients Diagnosed with Inguinal Hernia

Rakesh Kumar[1], I.S. Thakur[2]

[1]Senior Resident, Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India

[2]Professor and HOD, Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India

Received: 03-01-2025 / Revised: 10-02-2025 / Accepted: 25-02-2025
Corresponding Author: Dr. Rakesh Kumar
Conflict of interest: Nil

Abstract:

Background: Inguinal hernia is one of the most common surgical conditions in the world with a high prevalence in India, more so in elderly men and those with physically strenuous occupations. Even though highly prevalent, not much is known regarding its regional and clinical and demographic pattern.

Objective: The aim of this study was to study the demographic profile, clinical presentation, and risk factors in inguinal hernia patients in a tertiary care center.

Methodology: A prospective, observational study was conducted from December 2017 to January 2019 at Patna Medical College and Hospital, Bihar. A total of 90 patients diagnosed with primary inguinal hernia were evaluated based on inclusion/exclusion criteria. Data on age, sex, occupation, clinical symptoms, pain severity (via Visual Analogue Scale), and hernia type were collected and statistically analyzed using descriptive and inferential methods.

Results: More than half of the patients (41.1%) were ≥50 years, confirming age to be the most significant risk factor. The occupation survey revealed high incidence in agriculturists (26.7%), official workers (23.3%), and labourers (14.4%). Swelling was present in all patients (100%), and 36.7% of them also presented with pain, which was predominantly mild to moderate. Indirect hernias were the most prevalent (61.1%), followed by direct (31.1%) and combined (7.8%) hernias.

Conclusion: This research creates a strong correlation of increasing age, work stress, and prevalence of inguinal hernias. Indirect hernia was most frequent. These results form the foundation for focused screening and prompt surgery to prevent complications.

Keywords: Age-Related Prevalence, Clinical Profile, Demographic Characteristics, Indirect Hernia, Inguinal Hernia, Occupational Risk, Tertiary Care Hospital, VAS Score.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0) and the Budapest Open Access Initiative (http://www.budapestopenaccessinitiative.org/read), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Inguinal hernia is one of the most frequent surgical ailments to be addressed in general surgery worldwide. Inguinal hernia repair is one of the most common elective procedures performed in tertiary care centers in India, in particular. Hernias overall have an effect on about 15–20% of the population, and out of these, inguinal hernias contribute considerably to the surgical burden. In India, approximately 1.5 to 2 million inguinal hernias exist, and this makes the public health significance of this ailment highly relevant in the demographic landscape of the nation [1]. Epidemiological statistics always report a large gender disparity in the incidence of inguinal hernias with a predominance in men. Nearly 90% of all repairs of inguinal hernias are performed in men, and 70% of repairs of femoral hernias are performed in females. Lifetime risk of having an inguinal hernia has been estimated at 27% in men and only 3% in women, and this is because of anatomical and physiological reasons [2].

Age is the determining factor in the pathogenesis of inguinal hernia. The disease follows a bimodal pattern with peaks in early infancy and again in the later adult decades, more specifically after the fourth decade in men [3,4]. Femoral hernias continue to be more common in women, but inguinal hernias continue to be about five times more common. Of the two principal types—indirect and direct—indirect inguinal hernia is more commonly seen in both sexes. In men, the indirect-to-direct inguinal hernia ratio is roughly 2:1 [5]. This is a reflection of the underlying embryological and anatomical differences in the inguinal canal between the sexes. The classification of inguinal hernias is mainly determined by the anatomical relationship to surrounding

structures like the inferior epigastric vessels and the femoral ring. Direct hernias, for example, protrude medially within Hesselbach's triangle, while indirect hernias protrude laterally and exit through the deep inguinal ring. Femoral hernias, less frequent, occur more commonly in women and exit through the femoral ring, lateral to the pubic tubercle. Various classification systems, such as the Nyhus, European Hernia Society, and Zollinger's classification, provide specific diagnostic criteria for groin hernias, making appropriate surgical planning easier.

Clinically, inguinal hernias classically present as a palpable mass in the groin that becomes greater on straining or standing and may reduce or even become zero when the patient is recumbent. Pain or tenderness in the groin may be present but is less common. Some patients will present with associated symptoms of change in bowel habit or urinary symptoms. Complex presentations such as irreducibility, bowel obstruction, or strangulation are surgical emergencies and require emergency treatment. History of the whole patient, reducibility, and previous complications are significant in preoperative assessment [6].

The aetiology of inguinal hernia also varies with age of presentation. Children present more commonly with congenital inguinal hernias due to failure of obliteration of the processus vaginalis, offering a location for herniation. Yet, a patent processus vaginalis (PPV) alone is not sufficient to precipitate a hernia, and other conditions like raised intra-abdominal pressure or tissue weakness are also necessary to result in the condition. Adult-onset inguinal hernias, conversely, are acquired and are multifactorial in aetiology. Environmental, occupational, and genetic factors all have participatory roles to play in their development. Heavy lifting at work, chronic cough, or constipation raises intra-abdominal pressure and puts individuals at risk for hernia formation. Stunningly, obesity, once thought of as a risk factor with a rise in abdominal pressure, has an inverse relationship with inguinal hernia occurrence in some studies [7]. Overweight and obese patients are actually at reduced risk for developing an inguinal hernia, perhaps because of increased preperitoneal fat that cushions the sites of hernia development or reduced physical activity that lowers strain.

Considering the common occurrence of inguinal hernia in the practice of surgery, limited data regarding the demographic and clinical profile of operated cases in India, particularly from large tertiary centers, are present. Such data are crucial for disease pattern analysis, health care planning, and optimizing outcomes of surgery. Keeping this in mind, the present study was conducted to bridge this lacuna by assessing the demographic profile, clinical presentation, and risk factors of inguinal hernias in operated cases from a tertiary-level hospital in north India. For this, a hospital-based observational study was conducted to identify current trends and provide region-specific information that can be utilized for optimization of preventive and curative strategies in the treatment of inguinal hernia. Through the detailed documentation of the clinical profile of such patients, the study contributes to the current body of knowledge of this common but multicausal condition, and finally, it benefits surgeons and health planners in optimizing the provision of care to such patients.

Methodology

Study Design: This was a prospective, non-randomized, single-center observational research aimed at assessing the demographic and clinical characteristics of patients diagnosed with inguinal hernia.

Study Area: The research was carried out in the surgical Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India. The institution serves as a referral centre and caters to a diverse population from neighboring districts, offering an ideal setting to study various presentations of inguinal hernia.

Study Duration: The study was conducted over the period from December 2017 to January 2019. During this period, all patients presenting with signs and symptoms suggestive of inguinal hernia were evaluated for inclusion in the study.

Sample Size: All eligible patients diagnosed with primary inguinal hernia who presented to the surgical outpatient department during the study period were included. The final sample size was 90 based on the total number of such patients meeting the inclusion and exclusion criteria over the defined duration.

Inclusion Criteria

- All individuals diagnosed with primary inguinal hernia who visited the surgical outpatient department and were scheduled for surgery during the study period.

Exclusion Criteria

- Patients with recurrent or incarcerated inguinal hernia
- Patients with mental disorders, physical or impaired cognitive function
- Individuals using daily analgesics for other illnesses
- Patients with a history of prior groin surgery
- Refusal to provide informed consent

Procedure: All the patients with a past history of swelling in the groin, whether painful or not, were subjected to a clinical assessment by an experienced medical practitioner. After a clear description of the study protocol with a promise of confidentiality, demographic information like occupation, name, age, gender, socioeconomic status, and residence address

were systematically documented. A comprehensive clinical history was elicited to include the onset and character of symptoms, associated pain, and comorbidities like diabetes, hypertension, and chronic respiratory disease. Preoperative groin pain was assessed with the Visual Analogue Scale (VAS), which enabled patients to score their pain on a 0 to 10 scale. Pain levels were graded based on the VAS assessment as Nil (score = 0), Mild (1–3), Moderate (4–6), and Severe (>6). Surgical procedures were carried out for all the patients following established hospital procedures, and relevant intraoperative findings were noted.

Data Collection: Data were collected on a pretested proforma to maintain uniformity during the recording of variables. Demographic information like age, sex, occupation, and address were recorded after taking consent. Presenting symptoms and symptom duration were recorded along with comorbid disease history. Correct evaluation of groin pain was done using the Visual Analogue Scale (VAS), which provided standardized measurement of pain intensity. Trained staff collected data under the guidance of the principal investigator.

Statistical Analysis: All the data collected were input into a spreadsheet and analyzed statistically. Descriptive statistics were used to describe the data, with categorical variables like gender, pain categories, and occupation described in terms of frequency and percentage. Continuous variables like age were described in terms of mean values. The chi-square test was used to investigate associations between categorical variables, for instance, the relationship between pain severity and patient demographics. The level of statistical significance was a p-value of 0.05 or less. The analysis was done using standard statistical packages like SPSS or Microsoft Excel, thus ensuring reliability in interpretation of data.

Result

Table 1 demonstrates the age distribution of study participants diagnosed with inguinal hernia. The highest percentage of patients belonged to the age group of 50 years and above, comprising 41.1% of the total sample, indicating a higher prevalence in older individuals. This was followed by the age groups of 41–50 years (18.9%) and 21–30 years (20.0%). Participants aged 31–40 years represented 13.3%, while the youngest group, under 20 years of age, accounted for only 6.7%. The data suggests a clear age-related trend, with the risk of inguinal hernia increasing significantly in the aging population.

Table 1: Age distribution of study participants

Age group (Years)	N	Percentage
50 and above	37	41.10%
41–50	17	18.90%
31–40	12	13.30%
21–30	18	20.00%
< 20	6	6.70%
Total	90	100%

Fig. 1 shows the occupational distribution of study participants revealed that the majority were involved in agriculture, accounting for 26.7% of the total. This was followed by official workers, who comprised 23.3% of the participants. Labourers made up 14.4%, while vendors constituted 13.3%. Students represented 15.6% of the study group, indicating a notable proportion of younger individuals. The smallest group was housewives, contributing 6.7% to the overall sample. This distribution suggests that inguinal hernia is prevalent across a wide range of occupational backgrounds, with a higher occurrence among individuals engaged in physically demanding or active professions.

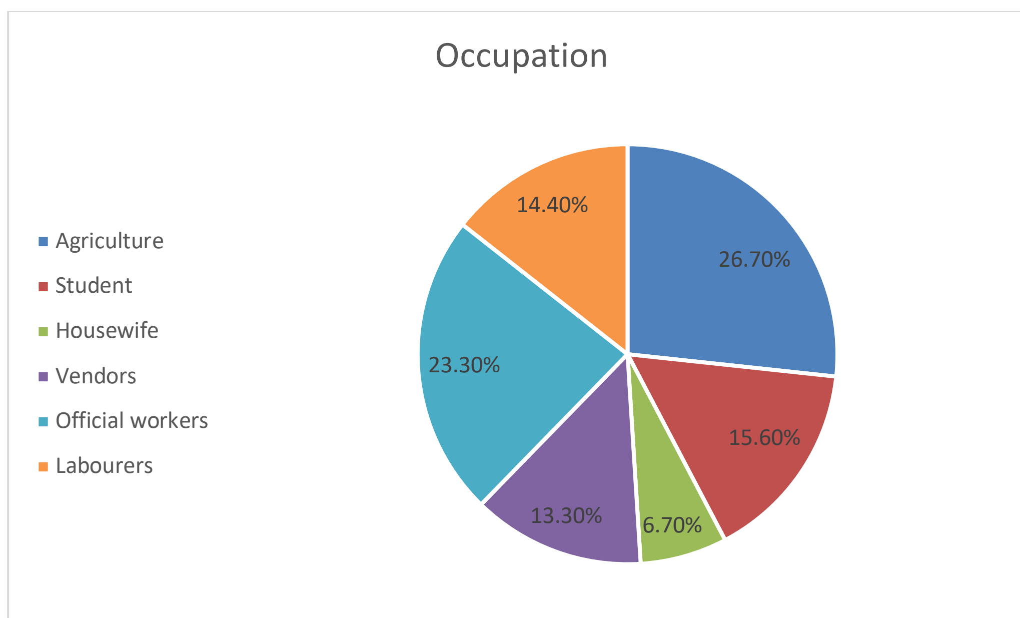

Table 2 explores the clinical presentation of inguinal hernia among the study participants. Swelling was the most common and universal symptom, observed in all 90 patients (100%), emphasizing it as the hallmark sign of inguinal hernia. Additionally, 36.7% of the patients (33 out of 90) also reported pain along with swelling, indicating that a significant proportion experienced discomfort in association with the hernia. These findings highlight that while swelling is a consistent presenting feature, pain is a variable symptom that may accompany the condition in a considerable number of cases.

Table 2: Clinical presentation of Inguinal Hernia

Symptoms	Number of Patients	Percentage
Swelling	90	100%
Pain with swelling	33	36.70%

Table 3 represents the severity of pre-operative pain assessed using the Visual Analogue Scale (VAS) among the 33 patients who reported pain. Mild pain was the most commonly reported, seen in 18 patients (54.5%), while moderate pain was noted in 15 patients (45.5%). None of the patients reported severe pain pre-operatively. This indicates that although a significant number of patients experienced discomfort, it was generally of mild to moderate intensity prior to surgery.

Table 3: Number and percentage of patients in each grade (Pre-op Pain VAS, N = 33)

Pre-operative Pain Score	Number of Patients	Percentage
Moderate	15	45.50%
Mild	18	54.50%
Total	33	100%

Table 4 displays the distribution of inguinal hernia types among the study participants. Indirect inguinal hernia was the most prevalent, found in 55 patients (61.1%), followed by direct hernia in 28 patients (31.1%). A smaller proportion, 7 patients (7.8%), had both direct and indirect hernias. These findings align with known epidemiological trends, where indirect hernias are more common, particularly due to congenital factors and anatomical weaknesses in the inguinal canal.

Table 4: Number of patients with each type of hernia

Type of Hernia	Number of Patients	Percentage
Both	7	7.80%
Direct	28	31.10%
Indirect	55	61.10%
Total	90	100%

Discussion

The present research was carried out with the intent to analyze the demographic and clinical profile of inguinal hernia patients in a tertiary care hospital. The data collected from 90 participants yielded significant trends in the parameters of age, occupation, clinical symptoms, pain intensity, and the types of hernias.

Age distribution revealed that the condition was predominantly seen in the elderly. The majority of patients (n = 37; 41.10%) were 50 years and older, indicating that older age is a significant risk factor for inguinal hernia. This finding is in line with the common fact that with increasing age, the musculature of the abdominal wall becomes weaker with the resultant development of hernia. The second most affected age group was 21–30 years with 18 patients (20.00%), followed by 41–50 years (n = 17; 18.90%), 31–40 years (n = 12; 13.30%), and below 20 years (n = 6; 6.70%). This trend is typical of a bimodal distribution, with the young and the old being more commonly involved, possibly due to the several etiological factors such as congenital weakness in the young and acquired degeneration of the old.

Kingsnorth and LeBlanc (2003) had established that inguinal hernia incidence increases with age, predominantly in males above 50 years, and had explained it because of progressive tissue elasticity loss and weakening of the transversalis fascia [8]. Likewise, the Turkish retrospective study by Kulacoglu et al. (2012) also concluded that patients aged more than 50 years predominated as close to 45% of inguinal hernia, once again emphasizing age as a critical factor [9].

The second highest prevalence rate in our research was 21–30 years (20%), which is somewhat diverging from research that commonly shows a more gradual slope from young to old adult years. But physical or professional stress can be the reason for the early peak. To verify this, Basimbe et al., (2013) in research of a tertiary care center in India found a high prevalence (22%) of inguinal hernia in the age group 20–30 years and attributed it to hard labor occupations and heavy lifting [10]. This suggests that occupational and lifestyle factors can be the reason for an earlier peak in populations.

Occupational history-wise, a considerable percentage of patients had physically strenuous occupations. Agricultural labourers constituted the most noteworthy occupational group (n = 24; 26.70%) followed by official employees (n = 21; 23.30%) and labourers (n = 13; 14.40%). All these occupations involve strenuous exercise, lifting, or standing for long hours—all of which are well-established to increase intra-abdominal pressure, a major risk factor in hernia formation. Notably, 14 cases were students (15.60%), possibly pointing towards congenital or lifestyle factors such as bad posture or sedentary life. Vendors (n = 12; 13.30%) and housewives (n = 6; 6.70%) comprised small percentages, further substantiating the role of occupational stress in hernia etiology. Svendsen et al. (2013) [11] concluded that over 60% of inguinal hernia patients in their series were involved in manual or physically strenuous occupations, with farmers and wage labourers being most affected.

Similarly, Ashindoitiang et al. (2012) in Nigerian studies reported significant levels of inguinal hernias in farmers and laborers and how the occupational stress compromised the integrity of the abdominal wall [12]. Their findings confirm that long-term exposure to heavy lifting and absence of ergonomic practice, as normally found in agriculture and construction industry, predisposes to hernia, particularly in low-resource settings where prevention measures are not available.

Clinical, all 90 patients (100%) presented with swelling in the groin region, a classical sign of inguinal hernia. Pain was noticed by only a subset of patients (n = 33; 36.70%) in conjunction with the swelling. This indicates that several patients have painless hernia, which will result in delay in diagnosis and treatment until the hernia enlarges or becomes complicated. In those presenting with pain, the majority (n = 18; 54.50%) had mild pain on the Visual Analogue Scale (VAS), while 15 patients (45.50%) had moderate pain. These findings highlight the often-insidious symptomatology of inguinal hernias, reinforcing the importance of routine physical examination for early detection.

Similar trends have also been identified by Jenkins and O'Dwyer (2008) in a report that a high proportion of patients with inguinal hernias are either asymptomatic or mildly symptomatic and thus have delayed surgical repair [13].

The incidence of mild to moderate pain in complainers also concurs with the results of a prospective study by Bay-Nielsen et al. (2001), which assessed hernia symptoms in Danish men and concluded that almost 60% of hernia patients complained of no or minimal discomfort, severity of pain was seldom the leading presenting complaint [14]. Mild symptomatology is usually in conflict with the common impression of hernias as extremely painful, which might lead to underreporting and diagnostic delay.

Regarding the nature of hernia, indirect inguinal hernias were predominant, involving 55 patients (61.10%). This conforms with global epidemiological data that indirect hernias are prevalent, especially in men, due to persistence of the processus vaginalis. Direct hernias were present in 28 patients (31.10%), while 7 patients (7.80%) had both. The prevalence of indirect hernias might also be due to anatomical vulnerabilities of the inguinal canal and the fact that

they can occur in all ages, particularly in young adults.

Our findings are in line with those of Chen et al. (2009), who carried out a population-based study in Saudi Arabia and found that indirect hernias accounted for approximately 63% of all inguinal hernias, followed by those that were direct (30%) and combined (7%), and very much like our pattern [15]. Similarly, a Nigerian study by Adesunkanmi et al. (2000) found indirect hernias in 68% of their male patients, and they were caused by congenital malformations and increased intra-abdominal pressure secondary to physical activity [16].

The relatively lower prevalence of direct hernias (31.10%) in the present study is in line with their typical presentation in elderly age groups due to the acquired weakness of the posterior inguinal canal wall, particularly of the transversalis fascia. Direct hernias, as per WJ et al. (1961) have a tendency to occur in later life and also are closely related to conditions like aging, chronic cough, constipation, or prostatic hypertrophy, which lead to elevated intra-abdominal pressure in the long term [17].

The occurrence of indirect and direct hernias coexistent in 7.80% of the patients (pantaloon hernias) is also as seen in other tertiary institutions. For instance, Mittal et al. (2008) have reported a 9% occurrence of mixed hernias among their Indian patients and indicated that such cases are most likely to be seen in older patients with long-standing history of hernia and should be treated with care during surgery [18].

In general, the study indicates that inguinal hernias are most common among the elderly and those with physically demanding professions. Clinical presentation is almost uniform with swelling being the cross-cutting symptom, but pain varies in intensity. Indirect hernias are more common than direct or mixed hernias. The findings present the sobering picture of the demographic and clinical profile of inguinal hernia patients and can be of useful service to clinicians for early detection and focused intervention plans.

Conclusion

The demographic and clinical profile of patients diagnosed with inguinal hernia study identified the condition to be more frequent in elderly and those with physical labor occupations. Many of the patients were from agricultural and hard labor backgrounds, indicating occupational stress as a causative factor. Clinically, all patients had swelling, and a significant percentage also had pain, with most being of mild severity. Indirect hernia was found to be the most frequent type, followed by direct and combined types. The findings highlight the importance of age, occupation, and clinical presentation in the distribution and character of inguinal hernias, providing insight into early detection and targeted interventions.

References

1. Lomanto, D., Cheah, W. K. & Faylona, J. M. Inguinal hernia repair: toward Asian guidelines. Asian J Endosc Surg 8, 16–23 (2015).
2. Kingsnorth, A. & LeBlanc, K. Hernias: inguinal and incisional. Lancet 362, 10 1016 0140-6736 03 14746–0 (2003)
3. Maitra A, Kumar V. Diseases of infancy and childhood. Robbins and Cotran pathologic basis of disease. 2009 Jun 10;8:447-83.
4. Abramson, J. H., Gofin, J., Hopp, C., Makler, A. & Epstein, L. M. The epidemiology of inguinal hernia. A survey in western Jerusalem. J Epidemiol Community Health 32, 59–67 (1978).
5. Brunicardi, F. C., Andersen, D. K., Billiar, T. R., Dunn, D. L. & Hunter, J. G. Schwartz's principles of surgery. (McGraw-Hill Education, 2014).
6. Ruhl, C. E. & Everhart, J. E. Risk factors for inguinal hernia among adults in the US population. Am J Epidemiol 165, 1154–61 (2007).
7. B, G., L, T. & BJH, K. Risk factors for inguinal hernia in middle-aged and elderly men: results from the Rotterdam Study. Surgery 157, 540–6 (2015).
8. Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. The Lancet. 2003 Nov 8;362(9395):1561-71.
9. Kulacoglu H, Yazicioglu D, Ozyaylali I. Prosthetic repair of umbilical hernias in adults with local anesthesia in a day-case setting: a comprehensive report from a specialized hernia center. Hernia. 2012 Apr;16:163-70.
10. Basimbe F, Ongom P, Kijjambu S, Kituuka O. Postoperative pain in lichtenstein repair with Iliohypogastric neurectomy compared to standard lichtenstein repair, for inguinal hernias at Mulago Hospital, A Sub Saharan Africa Tertiary Centre. J Gen Pract. 2013;1(128):2.
11. Svendsen SW, Frost P, Vad MV, Andersen JH. Risk and prognosis of inguinal hernia in relation to occupational mechanical exposures—a systematic review of the epidemiologic evidence. Scandinavian journal of work, environment & health. 2013 Jan 1:5-26.
12. Ashindoitiang JA, Ibrahim NA, Akinlolu OO. Risk factors for inguinal hernia in adult male Nigerians: a case control study. International Journal of Surgery. 2012 Jan 1;10(7):364-7.
13. Jenkins JT, O'dwyer PJ. Inguinal hernias. Bmj. 2008 Jan 31;336(7638):269-72.
14. Bay-Nielsen M, Kehlet H, Strand L, Malmstrøm J, Andersen FH, Wara P, Juul P, Callesen T. Quality assessment of 26 304 herniorrhaphies in Denmark: a prospective nationwide study. The Lancet. 2001 Oct 6;358(9288):1124-8.

15. Chen LE, Zamakhshary M, Foglia RP, Coplen DE, Langer JC. Impact of wait time on outcome for inguinal hernia repair in infants. Pediatric surgery international. 2009 Mar;25(3):223-7.
16. Adesunkanmi AR, Badmos TA, Salako AA. Groin hernias in patients 50 years of age and above pattern and outcome of management in 250 consecutive patients. West African Journal of Medicine. 2000 Apr 1;19(2):142-7.
17. WJ L. Anatomy and function in hernia repair. Proceedings of the Royal Society of Medicine. 1961 Nov 1;54:967-70.
18. Mittal T, Kumar V, Khullar R, Sharma A, Soni V, Baijal M, Chowbey PK. Diagnosis and management of Spigelian hernia: A review of literature and our experience. Journal of minimal access surgery. 2008 Oct 1;4(4):95-8.