# Abdominal Hernia in Arar city, Northern Saudi Arabia; Prevalence, risk factors and character of the hernia

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**Abstract: Background:** Abdominal wall hernia is a very common surgical condition affecting all ages and both sexes. The main risk factors of hernia include pregnancy, weight lifting, constipation, and gaining weight. **Objective:** The aim of this study is to highlight the prevalence of abdominal hernia, its causes, treatment and complications among both sexes of Arar population. **Methods**: A descriptive cross-sectional study was conducted among 1567 adults living in Arar city population. Data was collected by personal interview via questionnaire translated into Arabic and general and local examination. **Results**: the overall prevalence of abdominal hernia was 11.7%, Hernia was more prevalent in females than males (63.4% Vs 36.6%), the most common sites was para-umbilical 33.9%, inguinal 27.3%, umbilical in 20.8%. of cases, 51.9% were obese, 53.6% had previous abdominal surgery, 19.1% had previous abdominal trauma, 28.4% had positive family history of hernia and 39.9% were grand multipara. Hernia was significantly affected by sex, obesity, previous abdominal surgery, previous abdominal trauma, positive family history of hernia and being grand multipara (P value < 0.05). Treatment of hernia was surgical in 47.5% and conservative in 47.0%, complications occurred in 20.2% and 25.1% was recurrent after treatment and of hernias. **Conclusion & Recommendations:** Abdominal wall hernias are common clinical presentation in Arar, KSA. Abdominal hernia is more common in women than men, there is an obvious relationship between obesity and hernia. Early diagnosis, easily accessible health facilities and health education are important to prevent complications. New modality of treatment should be adopted as the standard choice of care to prevent the recurrence.
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## Introduction :

Abdominal wall hernia is a very common surgical condition affecting all ages and both sexes and it's an abnormal protrusion of a peritoneal lined sac through the muscular covering of the abdomen [1]. The most common symptoms of a hernia include a swelling in the groin, heavy feeling in the abdomen, and discomfort in the abdomen regions, especially when coughing, lifting or bending over. However, symptoms may not appear on some people and only realize that they have this condition during medical checkups [2]. Also hernia is a rupture in smooth tissue through which an organ protrudes or pushes through. It is mainly common in the abdomen, groin regions, belly button and upper thigh. Common types include inguinal, hiatal and umbilical hernias. The most frequent hernia is the inguinal hernia (73% of cases) [1,2,4]. The time a hernia takes to develop depends on its causes, which relate to muscle weakness and strain. Common causes include chronic coughing, damage from an injury or surgery, and the inability of the wall of the abdomen to close properly [3]. The main risk factors of hernia include pregnancy, weight lifting, constipation, and gaining weight. The patient should seek medical attention if there is a painful or noticeable bulge on the abdomen, pubic bone or in the groin or if there is other symptoms of hernia. The patient can feel the bulge by touching the affected area or notice it when standing upright. It may be possible to push a hernia back into the abdomen or may be not according to the type of the hernia and the size of the hernia sac content. Abdominal wall hernias are common, classically taught to occur in at least 2% of men, [1] while statistics from the USA estimate 15 per 1000 population (1.5%).[2] More than 20 million hernias are estimated to be repaired every year around the world.[3] Treatment of abdominal hernia may be surgical or non-surgical according to the case and its severity. Some complications can occur after repairing the hernia if the patient didn't get the enough medical care, and it may come back in some cases. A hernia can develop quickly or over a long period of time, depending on its cause. More

than 750,000 hernias in USA and approximately 125,000 hernias in United Kingdom are operated per year [7]. The incidence of abdominal wall hernia in different countries varies from 100 - 300/100000 per year [2].

**Objective:**

The objective of this study is to highlight the prevalence of abdominal hernia, its causes, treatment and complications among both sexes of Arar population.

**Participants and Methods:**

A descriptive cross-sectional study was conducted among 1567 adults living in Arar city (the capital of the Northern Province of KSA).The data was collected during January and February 2017.

**Sampling design:** Multistage random sampling was employed to select the study population. Most districts are divided into subdivisions. Each subdivision is again divided into clusters. From the selected 2 was randomly selected. Subjects were selected starting from the reference point (north east corner of selected cluster) employing simple random sampling technique until the minimum sample size was achieved. Final sample comprised of 1567 adults.

**History taking:** included patient demographics (gender, age, marital status), type of hernia repair undertaken, and whether a primary or recurrent hernia, family history of hernia, type of hernia and the type of treatment of every case and complications if present.

**Clinical examination:** The survey was conducted by the Department of General Surgery, Northern Border University, Arar. The study population originally included all male residents aged 20 or over residing in Arar. The investigation comprised an interview at the subject's home and a subsequent examination by a doctor at the department's community health center. Special consideration was paid to standardizing techniques, including the careful training and regulation of interviewers and examiners and the use of standardized questions, examination procedures, and diagnostic criteria. The home interview included a question on the occurrence of hernia past or present. If it was answered positively, the man was asked if he had ever had an operation for hernia. The examining physician was informed of the replies. The examination procedure was the one described by Bailey (1942). The examining physician reported whether, in each groin, there was a visible and clearly palpable hernia; a palpable impulse; or an operation scar. The examination was conducted with the subject standing in a good light. After inspection, any visible lump was palpated to determine whether it was possible to 'get above it' with the thumb and index finger. If not, and if its neck was continuous with the inguinal canal or directed backwards into the abdomen, it was diagnosed as a palpable hernia. If there was no visible lump, the scrotum was invigilated by the little finger to reach the external ring, and the subject was asked to cough, in order to determine whether there was a palpable impulse. An impulse at the scar site on coughing was taken as evidence of recurrence. No attempt was made to distinguish between indirect and direct hernias. 'Swellings' and repaired hernias will be referred to below as 'obvious' hernias.

Measuring Body weight (in Kg) and height for calculation of BMI. Finally 1567 questionnaires were filled, the filled questionnaires were reviewed for completeness and accuracy before data entry.

**Statistical analysis:** Data were compiled and analyzed using statistical package for the social sciences (SPSS, version16) and results were analyzed with frequencies and Chi-squared test as appropriate Confidence level and p-value were set at 95% and 5%, respectively.

**Ethical considerations:** Our study was reviewed for seeking approval of the Research Ethics Committee of faculty of medicine, Northern Border University. The participation was completely voluntary and we informed our participants with that. No name was recorded on the questionnaires.

**Results:**

**Table (1)** illustrates the prevalence of hernia, socio-demographic characteristics and risk factors in the studied population. Only 183 (11.7%) cases from 1567 screened person have abdominal hernia, more than 54.2% of our participants were females, 86.9% were 18 - 50 years, 55.1% were married and 41.6% were single. As regards body weight, 45.4% had body weight 60-80Kg, 28.9% 80-120Kg and 1.6% >120Kg. Previous abdominal surgery was found in 23.9%, only 16% had family history of hernia, 7.7% had previous abdominal trauma and 2.2% had congenital anomalies.

**Table (2)** shows the relationship between presence of hernia and socio-demographic features and the risk factors in the participants. Hernia was more prevalent in females than males (63.4% Vs 36.6%) and 85.2% of cases were 18 to 50 years, 50.8% had body weight 60-80 Kg while 13.7% had less than 60 Kg, 51.9% were obese and 10.9% of cases do regular exercises. On the other hand (53.6% Vs 19.9%) had previous abdominal surgery, (19.1% Vs 6.1%) had previous abdominal trauma, 28.4% had positive family history of hernia and 39.9% were grand multipara (repeated

pregnancy more than 5 times). Hernia was significantly affected by sex, obesity, marital state, body weight (in Kg), previous abdominal surgery, previous abdominal trauma, positive family history of hernia and being grand multipara (P value < 0.05) and was non-significantly affected by age, regular exercise and presence of congenital anomalies (P value > 0.05).

**Table (3)** illustrate the character of hernia in the studied cases, we found that; the most common site of abdominal hernia was para-umbalical, as it was found in 33.9% of cases followed by inguinal 27.3% then umbilical in 20.8%. Hernia was non-reducible in 2.7% of cases. As regards treatment; surgical in 47.5% and conservative in 47.0% and 5.5% of cases was neglected without TTT. About quarter (25.1%) of hernias was recurrent after treatment and complications was found in 20.2% of hernias.

**Table (1): Prevalence of hernia, socio-demographic characteristics and risk factors in the studied population, Arar, 2017**

| Parameter | Frequency (n=1567) | Percent (%) |
|---|---|---|
| **Abdominal hernia** | | |
| Yes | 183 | 11.7 |
| No | 1384 | 88.3 |
| **Sex** | | |
| Male | 717 | 45.8 |
| Female | 850 | 54.2 |
| **Age (in year)** | | |
| < 18 | 126 | 8.0 |
| 18 - 50 | 1362 | 86.9 |
| > 50 years | 79 | 5.0 |
| **Weight (in Kg)** | | |
| < 60 | 378 | 24.1 |
| 60 – 80 | 711 | 45.4 |
| 80 – 120 | 453 | 28.9 |
| >120 | 25 | 1.6 |
| **Marital state** | | |
| Married | 863 | 55.1 |
| Single | 652 | 41.6 |
| Divorced or Widowed | 52 | 3.3 |
| **Obesity** | | |
| Yes | 544 | 34.7 |
| No | 1023 | 65.3 |
| **Regular exercise** | | |
| Yes | 202 | 12.9 |
| No | 1365 | 87.1 |
| **Congenital anomalies** | | |
| Yes | 34 | 2.2 |
| No | 1533 | 97.8 |
| **Previous abdominal surgery** | | |
| Yes | 374 | 23.9 |
| No | 1193 | 76.1 |
| **Previous abdominal trauma** | | |
| Yes | 120 | 7.7 |
| No | 1447 | 92.3 |
| **Family history of hernia** | | |
| Yes | 250 | 16.0 |
| No | 1317 | 84.0 |
| **Grand multipara (repeated pregnancy)** | | |
| Yes | 346 | 22.1 |
| No | 378 | 24.1 |

**Table (2): relationship between hernia and socio-demographic features and the risk factors in the studied population, Arar, 2017**

| Parameter | Abdominal hernias | | Total (n=1567) | Chi-Square | P value |
|---|---|---|---|---|---|
| | Yes (n=183) | No (n=1384) | | | |
| | No. (%) | No. (%) | No.(%) | | |
| **Sex** | | | | | |
| Male | 67 | 650 | 717 | 6.980 | 0.008 |
| | 36.6% | 47.0% | 45.8% | | |
| Female | 116 | 734 | 850 | | |
| | 63.4% | 53.0% | 54.2% | | |
| **Obesity** | | | | | |
| Yes | 95 | 449 | 544 | 27.035 | 0.00 |
| | 51.9% | 32.4% | 34.7% | | |
| No | 88 | 935 | 1023 | | |
| | 48.1% | 67.6% | 65.3% | | |
| **Marital state** | | | | | |
| Married | 125 | 738 | 863 | 21.240 | 0.00 |
| | 68.3% | 53.3% | 55.1% | | |
| Single | 48 | 604 | 652 | | |
| | 26.2% | 43.6% | 41.6% | | |
| Divorced or widowed | 10 | 42 | 52 | | |
| | 5.5% | 3.0% | 3.3% | | |
| **Body weight (in Kg)** | | | | | |
| < 60 | 25 | 353 | 378 | 13.265 | 0.004 |
| | 13.7% | 25.5% | 24.1% | | |
| 60 – 80 | 93 | 618 | 711 | | |
| | 50.8% | 44.7% | 45.4% | | |
| 80 – 120 | 63 | 390 | 453 | | |
| | 34.4% | 28.2% | 28.9% | | |
| > 120 | 2 | 23 | 25 | | |
| | 1.1% | 1.7% | 1.6% | | |
| **Age (in years)** | | | | | |
| < 18 | 13 | 113 | 126 | 3.090 | 0.213 |
| | 7.1% | 8.2% | 8.0% | | |
| 18 - 50 | 156 | 1206 | 1362 | | |
| | 85.2% | 87.1% | 86.9% | | |
| > 50 | 14 | 65 | 79 | | |
| | 7.7% | 4.7% | 5.0% | | |
| **Regular exercise** | | | | | |
| Yes | 20 | 182 | 202 | 0.710 | 0.399 |
| | 10.9% | 13.2% | 12.9% | | |
| No | 163 | 1202 | 1365 | | |
| | 89.1% | 86.8% | 87.1% | | |
| **Congenital anomalies** | | | | | |
| Yes | 4 | 30 | 34 | 0.00 | 0.987 |
| | 2.2% | 2.2% | 2.2% | | |
| No | 179 | 1354 | 1533 | | |
| | 97.8% | 97.8% | 97.8% | | |
| **Previous abdominal surgery** | | | | | |
| Yes | 98 | 276 | 374 | 1.005 | 0.00 |
| | 53.6% | 19.9% | 23.9% | | |

| | | | | | |
|---|---|---|---|---|---|
| No | 85 | 1108 | 1193 | | |
| | 46.4% | 80.1% | 76.1% | | |
| **Previous abdominal trauma** | | | | | |
| Yes | 35 | 85 | 120 | 38.533 | 0.00 |
| | 19.1% | 6.1% | 7.7% | | |
| No | 148 | 1299 | 1447 | | |
| | 80.9% | 93.9% | 92.3% | | |
| **Family history of hernia** | | | | | |
| Yes | 52 | 198 | 250 | 23.995 | 0.00 |
| | 28.4% | 14.3% | 16.0% | | |
| No | 131 | 1186 | 1317 | | |
| | 71.6% | 85.7% | 84.0% | | |
| **Grand multipara (repeated pregnancy more than 5 times)** | | | | | |
| Yes | 73 | 273 | 346 | 38.523 | 0.000 |
| | 39.9% | 19.7% | 22.1% | | |
| No | 37 | 341 | 378 | | |
| | 20.2% | 24.6% | 24.1% | | |
| Male or not married | 73 | 770 | 843 | | |
| | 39.9% | 55.6% | 53.8% | | |

**Table (3): character of hernia in studied cases, Arar, 2017**

| Parameter | Frequency (n=183) | Percent (%) |
|---|---|---|
| **Site of hernia** | | |
| Upper abdomen | 24 | 13.1 |
| Para-umbilical | 62 | 33.9 |
| Umbilical | 38 | 20.8 |
| Inguinal | 50 | 27.3 |
| Incisional | 9 | 4.9 |
| **Size of hernia** | | |
| Small | 133 | 72.7 |
| Moderate or huge size | 50 | 27.3 |
| **Reducibility of hernia during presentation** | | |
| Non-reducible (stable) | 5 | 2.7 |
| Reducible | 178 | 97.3 |
| **Diagnoses** | | |
| By physician | 125 | 68.3 |
| Self-diagnosis | 37 | 20.2 |
| Others | 21 | 11.5 |
| **Duration of diagnoses** | | |
| Within hours | 56 | 30.6 |
| Days | 43 | 23.5 |
| Weeks | 84 | 45.9 |
| **Type of treatment** | | |
| Surgical | 87 | 47.5 |
| Conservative | 86 | 47.0 |
| Non treated | 10 | 5.5 |
| **Recurrent after treatment** | | |
| Yes | 46 | 25.1 |
| No | 127 | 69.4 |
| Not treated | 10 | 5.5 |
| **Complication** | | |
| Yes | 37 | 20.2 |
| No | 146 | 79.8 |

| Duration of treatment | | |
|---|---|---|
| < 7 days | 49 | 26.8 |
| 7 - 14 days | 50 | 27.3 |
| > 14 days | 74 | 40.4 |
| Not treated | 10 | 5.5 |

**Discussion:**

Abdominal hernia is a common condition between both males and females specially umbilical and para-umbilical hernia [2]. Challenges in surgical practice in developing countries include delayed clinical presentation of patients10,14and very inadequate privately-funded health care financing [16].

Our study highlighted the prevalence of hernia, its causes, treatment and complications in Arar city.

In the current study, the most common site of abdominal hernia was para-umbalical, as it was found in 33.9% of cases followed by inguinal 27.3% then umbilical in 20.8%. Natalie study in the U.K found that, the relative frequency of different hernia types is: inguinal, umbilical, epigastric, incisional, para-umbilical and femoral [8]. Various authors all quote the following order of hernias, in decreasing frequency: inguinal (70–75%), femoral (6-7%), umbilical (3–8.5%) followed by rarer forms (1-2%) [1,2,5]. In Indian study, [17] lingual hernia had highest prevalence (21.8%) followed by Incsional (15.7) and paraumbelical (13.7%).

The results of this study showed that, hernia was significantly more prevalent in females than males (63.4% Vs 36.6%). Bedewi et al., study, in King Saud University, Riyadh, Saudi Arabia, found the adult para-umbilical hernia positive cases among females was 24.9% and that among males was 23.3% [14]. Textbooks quote the rate of umbilical and para-umbilical hernia to be up to five times commoner in women [5,6,7] citing pregnancy as a significant etiological factor. Another study made by Natalie study in the U.K was in complete contrast with this, showing that men in fact underwent more than twice as many umbilical and para-umbilical hernias [8].

Our study also found that 51.9% were obese, 10.9% of cases do regular exercises and 39.9% were grand multiparas women. Hernia was significantly affected by sex, obesity, body weight (in Kg), and being grand multipara (P value < 0.05), but there is no significant relationship between doing regular exercise and hernia. Matar, (2007) study in King Khalid Hospital, Al Kharj, Saudi Arabia [12] found obesity was the most common predisposing factor of hernia (63%) of cases and recurrence was more common in the obese patients. These findings was supported by (Russell, 2000) who stated that obesity plays an important role as a risk factor for hernia. Increasing BMI and increasing age are associated with a higher prevalence and an increased risk of incarceration of noninguinal abdominal wall hernias [13].

Stretching of the abdominal musculature due to increase in its contents as in obesity, in addition, adipose tissue acts to separate muscle bundles and layers, weakens aponeuroses and favors the appearance of abdominal, direct inguinal and hiatus hernias [5]. Deposition of adipose tissue differs between genders [9,10] and perhaps this contributes to gender differences in hernia formation. Therefore obesity, physical strain and pregnancy are important etiological factors in the development of abdominal hernia.

In a study done by Natalie D. in U.K in 2011, the researchers found a relationship between the age in females and accumulation of adipose tissue in the abdomen as postmenopausal women accumulate more fat in the intra-abdominal depot than do premenopausal women there will be a resultant increase in the number of postmenopausal women who accumulate intra-abdominal adiposity thereby predisposing to hernia development. Unlike our study in which only 5% of participants were above 50 years, and only 7.7% of hernia was above 50 years.

More than fifth (23.9%) of our participants represented with previous abdominal surgery, (53.6% Vs 19.9%) of hernia cases had previous abdominal surgery, this relatively high percentage indicates significant relationship (P value <0.05) and the previous abdominal surgery act as a significant risk factor for hernia. These findings are supported by findings from south-western Nigeria [11], stated that post obstetric and gynaecologic surgical interventions ranked highest as the cause of incisional hernia. This may be due to the weakness of abdominal wall after surgery.

Our study found also almost equal percentage (47.5% Vs 47.0%) of surgical and conservative treatment, unlike the study done in U.K, in which the most common way in treatment was the surgical way. This may be driven by increased healthcare spending, day-case operating becoming commonplace, and the greater feasibility of elective surgery in the elderly. Perhaps another factor affecting these results may be that doctors recommend surgery for earlier, even asymptomatic hernias, which in the past were left until they became symptomatic. This may be as a result of new surgical (e.g. laparoscopic) and anesthetic techniques perceived by referrers as ‘safer’, thereby allowing for repair in older and higher-risk surgical candidates. We have shown a general trend towards fewer operations being carried out on recurrent hernias. Matar, (2007) study in King Khalid Hospital, Al Kharj, Saudi

Arabia [12] concluded that, repair of incisional hernias still remains a challenge for the general surgeon and the surgical management has to be tailored to the individual patient.

No recurrence of hernia is common case in our study (69.4%), and this may be explained by looking to the means of development of hernia treatment. This results agree with the results of Natalie D. in U.K. [8]. In a follow-up study on recurrence after inguinal hernia repair in Saudi Arabia, all the patients were followed for 2 years after repair, with a total recurrence rate of 2.14 percent [15]. In Matar, (2007) study there was recurrence in 4.4% of cases during 3-year follow up [12]. In Langer et al., Recurrence is a common complication after repair of large abdominal incisional hernias. Recurrence rates of up to 33% after first repair and 44% after second repair have been reported [18].

**Conclusion &Recommendations:** Abdominal wall hernias are common clinical presentation in Arar, KSA. Abdominal hernia is more common in women than men, there is an obvious relationship between obesity and hernia. Early diagnosis, easily accessible health facilities and health education are important to prevent complications. New modality of treatment should be adopted as the standard choice of care to prevent the recurrence.

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