**SONOGRAPHIC FINDINGS IN PATIENTS WITH NON TRAUMATIC UPPER ABDOMINAL PAIN AT BEACONHEALTH AND FUNBELL DIAGNOSTIC CENTRES, IBADAN, NIGERIA**

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**Abstract**

This research was aimed at evaluating the usefulness of ultrasonography in the diagnosis and management of upper abdominal pain. A retrospective study was done at sonographic findings in patients with non traumatic upper abdominal pain at Beaconhealth and Funbell diagnostic centres, Ibadan, Nigeria. A total of 236 patients that were scanned for upper abdominal pain from March, 2023 to March, 2024 were studied. The sonographic reports showed that fatty liver is the highest sonographic findings in patients with upper abdominal pain with a total number of 50 (21.18%), followed by hepatitis 36(15.25%), pyelonephritis 30(12.71%), hydrohephrosis 19(8.05%), Splenomegaly 14(5.93%), 10(4.23%) each for cholecystitis and normal studies and PUD, renal stone 8(3.38%), glomerulonephritis 7(2.96%), renal failure 4(1.69%), pancreatitis 3(1.27%), gall bladder sludge 2(0.88%), 1(0.42%) each for multiple hepatic cyst, liver mass and poly cystic kidney. It was also found that 31-35years age group was mostly affected with upper abdominal pain and 0-5 years age group was the least affected. Finally, the incidence of upper abdominal pain was greater in female than in male.

**Keywords:** Hydrohephrosis, Abdominal ultrasound, Abdominal pain, Glomerulonephritis, Hepatic cyst, Cholecystitis, Splenomegaly, Pyelonephritis.

**1. Introduction**

Abdominal ultrasound is a rapid and non-invasive method of examination of the abdomen (Mozzini et al., 2019). Abdominal ultrasound is an imaging procedure used to examine the internal organs of the abdomen including the liver, gallbladder, spleen, intestines, pancreas and kidney. The blood vessels that lead to some of these organs can also be looked at with ultrasound (Ugwuanyi et al., 2017). Abdominal pain is a leading reason for undergoing an abdominal scan. Ultrasound, being a non-invasive technique, is frequently used to investigate patients experiencing abdominal discomfort. Among these, upper abdominal pain is a particularly common complaint for those seeking medical attention(Allemann et al., 1999).Upper abdominal ultrasound can reveal many possible conditions including abdominal aortic aneurysm, abscess, cholecystitis, gall stone, hydronephrosis, kidney stones, splenomegaly and pancreatitis(Kim &Pickhardt, 2012).

For an ultrasound of the liver, gallbladder, or digestive tract, patients are typically required to fast overnight or for at least six hours before the procedure. This fasting reduces bowel gas, which can obscure the imaging, and ensures the gallbladder remains filled with bile, enhancing the visibility of its contents. For examinations of the stomach and duodenum, patients are usually instructed to drink water just before the test, as these organs are more easily visualized when filled with fluids (Sinan et al., 2003).

According to Imran (2003). Patients with upper abdominal pain represent the largest group seeking care in medical and surgical outpatient departments. After taking a patient's history and performing a clinical examination, ultrasonography is often one of the first and most effective diagnostic tools used (Jeffrey & Ralls, 1995). Upper abdominal pain, whether acute or chronic, can result from conditions affecting the liver, gallbladder, kidneys, pancreas, stomach, duodenum, spleen, pleura, pericardium, or the basal segments of the lungs (Jeffrey & Ralls, 1995; Sanders & Miner, 1998). Rare causes include aortic aneurysm and acute myocardial infarction. All these conditions have useful sonographic features which help in their diagnosis except uncomplicated peptic ulcer disease, acute myocardial infarction and based pneumonitis(Jeffrey & Ralls, 1995; Sanders & Miner, 1998).

A research done by Cyoyal (2004) showed that 82 cases for upper abdominal ultrasound were scanned. It reveal that 18 have gallstone, 4 have fatty liver, 4 have dilated common duct, 2 have thick walled gallbladder, 2 have hepatic cyst and one patient each for the following has splenomegaly, focal liver abnormalities, renal cyst, partial nephrectomy, gallbladder poly and abnormal liver texture.

In aresearch conducted by Mir et al., (2000) on upper abdominal ultrasound revealed the following findings, expressed as percentages of all patients: Fatty liver: 90.58%, auto-splenectomy: 55.4%, markedly reduced splenic size: 31.0%, reduced renal size: 27.1%, cholelithiasis: 25.7%, splenomegaly: 4.1% and renal enlargement: 2.78%.

The prospective study by Wibulpolprasert & Hiensiri (1999) involved 251 patients ranged 2-77 years who were hospitalized with brucellosis during a 4-years period. Patient were classified as having acute (<3 months), sub acute (3-12) months, or chronic (> 12 months) disease. Physical, laboratory and abdominal sonographic findings were analyzed. The disease was acute in 92 cases (36.7%), subacute in 48(19.1%) and chronic in 111 (44.2%). Sonographic examination of the abdomen showed enlarged periportal lymph nodes in 23 patients (9.2%), splenomegaly in 21(8.4%), hepatomegaly in 15(6%), pleural effusion in 7(2.8%), splenic abscesses in 4(1.6%), splenic cysts in 2(0.8%), acute appendicitis in 2(0.8%) and acute calculus cholecystitis in 1 patient (0.4%).

In work done by Speets (2004), abdominal ultrasound is a valuable investigation in patients with suspected of biliary pathology and in evaluating abdominal masses. Patients with localized pain and tenderness are more likely to have a positive findings on ultrasound examination than are those with defuse abdominal pain and tenderness pain ultrasound is less useful in patients who are less than 25 years of age especially when there symptoms and signs are non specific and the laboratory results are normal.

Another study done by (Raman, 2003) showed that the mean age of the patient at the time of the abdominal ultrasound was 54 years and were 35% male. 10% of the patients had a prior diagnosis of choleliathiasis and 7% had a prior cholecystectomy. Almost 80% of the patients had complaints of abdominal pain. Abnormalities with physical examination were found in 44% of the patients. The most common suspected diagnosis was cholelithiasis (47%) and nephrolithiasis (13%). Diagnostic sonography (ultrasonography) is an ultrasound-base diagnostic imaging technique used for visualizing subcutaneous body structures including tendons, muscles, joints, vessels and internal organs for possible pathology or lesions. In physics, the term "ultrasound" applies to all sound waves with a frequency above the audible range of human hearing, about 20 kHz. The frequencies used in diagnostic ultrasound are typically between 2 and 18 MHz (Díaz Agurto et al., 2024) . Ultrasonography uses a probe containing multiple acoustic transducers to send pulses of sound into a material (Case, 1998). Whenever a sound wave encounters a material with a different density (acoustical impedance), part of the sound wave is reflected back to the probe and is detected as an echo. The time it takes for the echo to travel back to the probe is measured and used to calculate the depth of the tissue interface causing the echo. The greater the difference between acoustic impedances, the larger the echo is. If the pulse hits gases or solids, the density difference is so great that most of the acoustic energy is reflected and it becomes impossible to see deeper (Case, 1998). The frequencies used for medical imaging are generally in the range of 2 to 18 MHz. Higher frequencies have a correspondingly smaller wavelength, and can be used to make sonograms with smaller details. However, the attenuation of the sound wave is increased at higher frequencies, so in order to have better penetration of deeper tissues, a lower frequency (3–5 MHz) is used (Čarovac et al., 2011). Seeing deep into the body with sonography is very difficult. Some acoustic energy is lost every time an echo is formed, but most of it (approximately 0.05cm) is lost from acoustic absorption. The speed of sound varies as it travels through different materials, and is dependent on the acoustical impedance of the material (Oraevsky, 2014). However, the sonographic instrument assumes that the acoustic velocity is constant at 1540 m/s. An effect of this assumption is that in a real body with non-uniform tissues, the beam becomes somewhat de-focused and image resolution is reduced (Sanders & Miner, 1998). To generate a 2D-image, the ultrasonic beam is swept. A transducer may be swept mechanically by rotating or swinging. Or a 1D phased array transducer may be used to sweep the beam electronically. The received data is processed and used to construct the image. The image is then a 2D representation of the slice into the body. 3D images can be generated by acquiring a series of adjacent 2D images. Commonly a specialized probe that mechanically scans a conventional 2D-image transducer is used. However, since the mechanical scanning is slow, it is difficult to make 3D images of moving tissues. Recently, 2D phased array transducers that can sweep the beam in 3D have been developed. These can image faster and can even be used to make live 3D images of a beating heart (The Gale Encyclopedia of Medicine, 2006). Doppler ultrasonography is utilized to examine blood flow and muscle movement. Different velocities are displayed in color to simplify interpretation. For instance, a leaking heart valve will appear as a flash of distinct color. Alternatively, colors can be used to represent the amplitudes of the detected echoes (Hoskins &McDicken, 1997).

**2. Methodology**

**2.1 Method**

This study is non-experimental retrospective research design.

**2.2 Target Population**

The target population includes all the patients that had ultrasound scan as a result of upper abdominal pain at Beaconhealth and Funbell diagnostic centers Ibadan, Nigeria (from March 2023– March 2024).

**2.3 Sampling Technique**

The convenient method of non-probability sampling technique was used. This was because all the patients ‘folders were saved and secured.

**2.4 Sample Size**

A total of 236 patients data were retrieved from their sonographic reports from March 2023-March 2024. It was the period of non-interrupted machine breaks down.

**2.5 Source of Data/Material For The Study**

The sources of data for this study were ultrasound reports in Beaconhealth and Funbell diagnostic centers Ibadan, Nigeria.

**2.6 Method of Data Collection**

The data were collected from existing reports in the retrieved files. The following data were collected from the patient’s reports

The patient’s number.

The patient’s sex.

The patient’s age.

The ultrasound report/diagnoses.

**2.7 Selection Criteria**

Inclusion criteria:

 All cases with history of upper abdominal pain in non traumatic patients.

Exclusion criteria:

All cases of traumatic patients.

All patients that came for any other study rather than upper abdominal study.

**2.8 Data Analysis**

The data were analyzed with tables and graphs.

**2.9 Data Presentation and Results**

The data were presented in tables to show different pathologies in different organs that were discovered in the research. Their gender distributions were also presented and their different percentages

**3. Result**

The data were analyzed from existing reports in the retrieved files from both centers.

**Table 1: Age Distribution of Sonographic Findings in Patients With Upper Abdominal Pain (****Beaconhealth Diagnostic Center**.)

|  |  |  |
| --- | --- | --- |
| **Age**  | **Frequency**  | **Percentages**  |
| 0-5 | 1 | 0.90 |
| 6-10 | 3 | 2.70 |
| 11-15 | 8 | 7.21 |
| 16-20 | 15 | 13.51 |
| 21-25 | 22 | 19.82 |
| 26-30 | 8 | 7.21 |
| 31-35 | 14 | 12.61 |
| 36-40 | 6 | 5.41 |
| 41-45 | 9 | 8.11 |
| 46-50 | 2 | 1.80 |
| 51-55 | 2 | 1.80 |
| 56-60 | 1 | 0.90 |
| 61-65 | 5 | 4.50 |
| 65-70 | 1 | 0.90 |
| Patients whose age were not recorded | 14 | 12.61 |
| **Total** | **111** | **100** |

Table 1: Shows that upper abdominal pain occurs most in 21-25years age group 23(19.87%) followed by 16-20 years age group 15(13.51%)s, 14 (12.61%) for 31-35 years age group, 9(8.11) for 41-75 years age group, 8(7.21%) for 11-15 and 26-30 years age groups, each 6(5.41%) for 36-40 years age group, 5(4.50) for 61-65 years age group, 3(2.70%) for 6-10 years age group 1(0.90%) for 0-5, 56-60 and 65-70 years age group each and 14 (12.61%) for patients whose ages were not recorded in the files.

**Beaconhealth Diagnostic Centers**

**Table 2: Organ Distribution Of Cases in Patients With Upper Abdominal Pain and Their Percentages**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Organs**  | **Males**  | **Females**  | **Frequency** | **Percentages (%)** |
| Liver  | 13 | 31 | 44 | 39.64 |
| Kidney  | 15 | 14 | 29 | 26.13 |
| Gall bladder  | 5 | 10 | 15 | 13.51 |
| Pancreas  | 0 | 0 | 0 | 0 |
| Upper GIT  | 3 | 6 | 9 | 8.11 |
| Spleen  | 0 | 4 | 4 | 3.60 |
| Normal studies  | 6 | 4 | 10 | 9.01 |
| **Total** | **42** | **69** | **111** | **100** |

Table 2: Shows that liver has the highest pathologies 44(39.64%) followed by 29(26.15%) kidney, 15 (13.81%) gall bladder, 9(8.11%) upper GIT, 4 (3.60%) spleen and 10 (9.01%) normal studies.

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**Table 3: Sonographic Findings in Non-Traumatic Patients With Upper Abdominal Pain And Their Gender Distributions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sonographic findings**  | **Male(s)** | **Female (s)** | **Frequency**  | **Percentage of number of cases** |
| Fatty liver | 5 | 14 | 19 | 17.12 |
| Hepatitis  | 7 | 16 | 23 | 20.72 |
| Multiple hepatic cyst | 0 | 2 | 2 | 1.80 |
| Hydronephrosis  | 6 | 6 | 12 | 10.81 |
| Glomerulonephritis  | 1 | 4 | 5 | 4.50 |
| Renal cyst  | 4 | 3 | 6 | 5.41 |
| Renal failure  | 4 | 0 | 4 | 3.60 |
| Renal stone  | 1 | 0 | 1 | 0.90 |
| Poly cystic kidney  | 0 | 1 | 1 | 0.90 |
| Cholelithiasis  | 4 | 9 | 13 | 11.71 |
| Cholecystitis  | 1 | 1 | 2 | 1.80 |
| Splenomegaly  | 0 | 4 | 4 | 3.60 |
| PUD  | 3 | 6 | 9 | 8.11 |
| Pancreatitis  | 0 | 0 | 0 | 0.00 |
| Normal studies  | 6 | 4 | 10 | 9.01 |
| **Total**  | **42** | **69** | **111** | **100** |

Table 3: Shows that hepatitis is the highest sonographic findings in patients with upper abdominal pain 23(20.72%) followed by Fatty liver19 (17.12%), 13 (11.71%)cholelithiasis, 12 (10.81%) hydronephrosis, 10(9.01)normal studies 9(8.11%)PUD , 6(5.41%)renal cyst, 5(4.5%) glomerulonephritis,, 4(3.60%)each for renal failure and splenomegely, 2(1.80%)cholecystitis and 1(0.90%)each for multiple hepatic cyst, haepatoma, renal stone and poly cystic kidney.

**Funbell Diagnostic Center**

**Table 4: Age Distribution Of Sonographic Findings in Patients With Upper Abdominal Pain.**

|  |  |  |
| --- | --- | --- |
| **Age**  | **Frequency**  | **Percentages**  |
| 0-5 | 0 | 0 |
| 6-10 | 4 | 3.20 |
| 11-15 | 6 | 4.80 |
| 16-20 | 1 | 0.80 |
| 21-25 | 8 | 6.40 |
| 26-30 | 15 | 12.00 |
| 31-35 | 19 | 15.20 |
| 36-40 | 10 | 8.00 |
| 41-45 | 7 | 5.60 |
| 46-50 | 8 | 6.40 |
| 51-55 | 2 | 1.60 |
| 56-60 | 3 | 2.40 |
| 61-65 | 2 | 1.60 |
| 65-70 | 1 | 0.80 |
| Patients whose age were not recorded | 39 | 31.20 |
| **Total** | **125** | **100** |

Table 4: Shows that upper abdominal pain occurs most in 31 – 35 years age group 19(15.20%) followed by 26 – 30 years age group 15(12.00%), 10(8.00%) for 36 – 40 years age group, 8(6.40%) each for 21 – 25 and 46- 50years of age groups, 7 (5.60) for 41 -45 years age group, 6(4.80%) for 11 -15years age group, 4(3.20%) for 6 – 10 years age group, 3 ( 2.40%) for 56 - 60 years of group, 2(1. 60%) each for 51 – 55 and61 – 65 years of groups, 1 (0.80%) each for 16 – 20 and 65 – 70 years age groups and 39 (31.2%) for patients whose ages were not recorded in the files.

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**TABLE 5: ORGANS DISTRIBUTION OF CASES IN PATIENTS WITH UPPER ABDOMINAL PAIN AND THEIR PERCENTAGES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  **Organs**  | **Males**  | **Females**  | **Frequency** | **Percentages%** |
| Liver  | 22 | 26 | 48 | 38.40 |
| Kidney  | 21 | 26 | 47 | 37.60 |
| Gall bladder  | 7 | 10 | 17 | 13.60 |
| Pancreas  | 1 | 2 | 3 | 2.40 |
| Upper GIT  | 0 | 0 | 0 | 0 |
| Spleen  | 4 | 6 | 10 | 8.00 |
| Normal studies  | 0 | 0 | 0 | 0.00 |
| Total | 55 | 70 | 125 | 100 |

**Table 5:**  Shows that liver has the highest pathologies 48(38.40%), followed by 47(37.60%) kidney, 17(13.60%) gall bladder, 10(8.00%) spleen and 3(2.40%) pancreas.

**Funbell Diagnostic Center**

**Table 6: Sonograhic Findings in Patients With Upper Abdominal Pain and Their Gender Distribution**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sonographic findings**  | **Male(s)** | **Female (s)** | **Frequency**  | **Percentage of number of cases** |
| Fatty liver | 14 | 17 | 31 | 24.80 |
| Hepatitis  | 7 | 6 | 13 | 10.40 |
| Liver mass | 1 | 0 | 1 | 0.80 |
| Pyelonephritis | 10 | 23 | 33 | 26.40 |
| Hydronephrosis  | 6 | 1 | 7 | 5.60 |
| Glomerulonephritis  | 1 | 1 | 2 | 1.60 |
| Renal cyst  | 0 | 1 | 1 | 0.80 |
| Renal stone | 4 | 3 | 7 | 5.60 |
| Cholelithiasis  | 3 | 4 | 7 | 5.60 |
| Cholecystitis  | 3 | 5 | 8 | 6.40 |
| Gall bladder  | 1 | 1 | 2 | 1.60 |
| Splenomegaly  | 4 | 6 | 10 | 8.00 |
| Pancreatitis | 1 | 2 | 3 | 2.40 |
| **Total**  | **55** | **70** | **125** | **100** |

Table 6: Shows that pyelonephritis is the highest sonographic findings in patients with upper abdominal pain with 33(26.40%), followed by fatty liver 31(24.80%), hepatitis 13(10.40%), splenomegaly 10(8.00%), cholecystitis 8(6.40%), 7(5.60%) each for hydronephrosis, renal stone and cholelithrasis, pencreatitis 3(2.40%), 2 (1.60%) each for glomerulonephritis and gall bladder sludge and 1(0.80%) each for liver mass and renal cyst.

**Beaconhealth and Funbell Diagnostic Centers**

**Table7: Age Distribution of Sonograptic Findings in Non- Traumatic Patients With Upper Abonminal Pain**

|  |  |  |
| --- | --- | --- |
| **Age group** | **Frequency** | **Percentage (%)** |
| 0 - 5 | 1 | 0.42 |
| 6 – 10 | 7 | 2.97 |
| 11 – 15 | 14 | 5.93 |
| 16 – 20 | 16 | 6.80 |
| 12 – 25 | 30 | 12.71 |
| 26 -30 | 23 | 9.74 |
| 31- 35 | 33 | 13.98 |
| 36- 40 | 16 | 6.80 |
| 41 – 45 | 16 | 6.70 |
| 46 – 50 | 10 | 4.24 |
| 51 – 55 | 4 | 1.69 |
| 56 – 60 | 4 | 1.69 |
| 61 – 65  | 7 | 1.96 |
| 65 -70 | 2 | 0.84 |
| Patients whose ages were not recorded in the files | 53 | 22.45 |
| **Total** | **236** | **100** |

Table 7: Shows that upper abdominal pain occurs most in 31 – 33 years age group 33 (13.98%), followed by 21-25 year age group 30(12,71%), 23(9.74) for 26-30 years age group, 16-20, 36- 40 and 41-45 years age groups have 16 (6-80%) each, 53 (22.45%), 11-15 years age group,7 (2.97%) each for 6- 10 and 61-65 years age groups, whose ages were not recorded in the files 4(1.69%)each for 51-55 and 56 – 60 years age group, 2 (0.84%) for 65-70 years age group and 1(0.42%) for 0-5 years age group.

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**Table 8:** **Organ Distributions of Cases in Patients With Upper Abdominal Pain And Their Percentages**

|  |  |  |
| --- | --- | --- |
| **Organs**  | **Frequency** | **Percentages %** |
| Liver | 92 | 38.98 |
| kidney  | 76 | 32.20 |
| Pancreas  | 3 | 1.27 |
| Spleen | 14 | 5.93 |
| Upper GIT | 9 | 3.81 |
| Gall bladder | 32 | 13.56 |
| Normal studies | 10 | 4.24 |
| **Total**  | **236** | **100** |

Table 8: Shows that liver has the higher pathologies 92 (38.98%) followed by 76 (32.20%) kidney, 32(13.56%) gallbladder, 14 (5.93%) spleen, 10 (4.24%) normal studies, 9 (3.81%) upper GIT and 3 (1.27%) pancreas

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**Table 9: Organ Distribution Of Cases in Gender of Patients With Upper Abdominal Pain And Their Percentages**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Organs**  | **Males**  | **Females**  | **Percentage of males** | **Percentage of female** |
| Liver  | 35 | 57 | 36.08 | 41.01 |
| Kidney  | 36 | 40 | 37.11 | 28.78 |
| Pancreas  | 1 | 2 | 1.03 | 1.44 |
| Spleen  | 4 | 10 | 4.12 | 7.19 |
| Upper GIT  | 3 | 6 | 3.09 | 4.32 |
| Gall bladder  | 12 | 20 | 12.37 | 14.39 |
| Normal studies | 6 | 4 | 6.19 | 2.88 |
| **Total** | **97** | **139** | **100** | **100** |

Table 9: Shows that most of these pathologies were found in females 139(58.90%) and 97(41.10%) in males. Liver pathologies dominates in female 57(41.10%) and it also dominates in male 35 (36.08%).

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**Table 10:** **Sonographic Findings in The Liver And Their Gender Distribution in Patients With Upper Abdominal Pain**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sonographic findings** | **Male(s)** | **Female(s)** | **Frequency**  | **Percentage****Of number of cases**  | **Percentage of males (%)**  | **Percentage of females (%)** |
| Fatty liver  | 19 | 31 | 50 | 43.47 | 54.28 | 54.38 |
| Hepatitis | 14 | 22 | 36 | 39.13 | 40 | 38.59 |
| Multiple hepatic cyst | 0 | 2 | 2 | 2.17 | 0 | 3.51 |
| Haemangioma | 0 | 3 | 3 | 3.26 | 0 | 5.26 |
| Liver mass  | 1 | 0 | 1 | 1.09 | 2.86 | 0 |
| **Total** | **35** | **57** | **92** | **100** | 100 | 100 |

 Table 10: Shows that fatty liver is the highest sonographic findings in the liver with a total number of 40(43.47%) followed by hepatits 36(39.13%), 3(3.26%) haemangioma and 1(1.09%) for multiple hepatic cyst, hepatoma and liver mass each. A total of 92(38.98%) of the 236 findings originated from the liver, 57 were females and 35 in males.

**Beaconhealth And Funbell Diagnostic Centers**

**Table 11:** **Sonographic Findings in The Kidney And Their Gender Distributions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sonographic findings**  | **Male(s)** | **Female(s)** | **Frequency**  | **Percentages (%)**  |
| Pyelonephritis | 10 | 20 | 30 | 39.47 |
| Hydronephrosis | 12 | 7 | 19 | 25.00 |
| Glomerulonephritis | 2 | 5 | 7 | 9.21 |
| Renal cyst  | 3 | 4 | 7 | 9.12 |
| Renal stone  | 5 | 3 | 8 | 10.53 |
| Renal failure  | 4 | 0 | 4 | 5.26 |
| Poly cyst kidney  | 0 | 1 | 1 | 1.32 |
| **Total**  | **36** | **40** | **76** | **100** |

 Table 11: Shows that pyelonephritis is the highest sonographic findings in the kidney with 30(39.47%), followed by hydronephrosis 19(25.00%), glomerulonephritis and renal cyst 7(9.21%) each, renal failure 4(5.26%) and poly cystic kidney 1(1.32%). A total of 76 (32. 20%) of the 236 findings originated from the kidney, 40 were females and 36 males.

**Beaconhealth And Funbell Diagnostic Centers**

**Table 12:** **Sonographic Finding in The Gall Bladder And Their Gender Distributions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sonographic findings**  | **Males**  | **Females**  | **Frequency**  | **Percentage of female** |
| Cholelithiasis  | 20 | 7 | 13 | 62.5 |
| Cholecystistis | 10 | 4 | 6 | 31.25 |
| Gall bladder studies  | 2 | 1 | 1 | 6.25  |
| **Total**  | **32** | **12** | **20** | **100** |

Table 12: shows that cholelithiasis is the highest sonographic findings in the gallbladder with 20(62.50%) followed by cholecystitis 10 (31.25%) and gall bladder sludge 2(6.25%).A total of 32 (13.56%) of the 236 findings originated from the gallbladder, 20 were females and 12 males.

**Beaconhealth And Funbell Diagnostic Centers**

**Table 13: Sonographic Findings in Non-Traumatic Patients With Upper Abdominal Pain And Their Gender Distributions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sonographic findings**  | **Male(s)** | **Female (s)** | **Frequency**  | **Percentages (%)** |
| Fatty liver | 19 | 31 | 50 | 21.18 |
| Hepatitis  | 14 | 22 | 36 | 15.25 |
| Multiple hepatic cyst | 0 | 2 | 2 | 0.84 |
| Liver mass  | 1 | 0 | 1 | 0.42 |
| Haemangioma | 0 | 3 | 3 | 1.27 |
| Pyelonephritis  | 10 | 20 | 30 | 12.71 |
| Glomerolunephritis | 2 | 5 | 7 | 2.96 |
| Hydronephrosis  | 12 | 7 | 19 | 8.05 |
| Renal cyst | 3 | 4 | 7 | 2.96 |
| Renal stone | 5 | 3 | 8 | 3.38 |
| Renal failure | 4 | 0 | 4 | 1.69 |
| Poly cystic kidney | 0 | 1 | 1 | 0.42 |
| Cholelithiasis  | 7 | 13 | 20 | 8.47 |
| Cholecystitis  | 4 | 6 | 10 | 4.23 |
| Gallbladder sludge | 1 | 1 | 2 | 0.85 |
| Splenomegaly  | 4 | 10 | 14 | 5.93 |
| PUD  | 23 | 6 | 9 | 3.81 |
| Pancreatitis  | 1 | 2 | 3 | 1.27 |
| Normal  | 6 | 4 | 10 | 4.24 |
| Total | 97 | 139 | 236 | 100 |

Table 13: Shows that fatty liver is the highest sonographic findings in patients with upper abdominal pain with a total number of 50 (21.18%), followed by hepatitis 36(15.25%), pyelonephritis 30(12.71%), hydrohephrosis 19(8.05%), Splenomegaly 14(5.93%), 10(4.23%) each for cholecystitis and normal studies and PUD, renal stone 8(3.38%), glomerulonephritis 7(2.96%), renal failure 4(1.69%), pancreatitis 3(1.27%), gall bladder sludge 2(0.88%), 1(0.42%) each for multiple hepatic cyst, liver mass and poly cystic kidney.



**Figure 1**. **Age distribution of sonographic findings in patients with upper abdominal pain (beaconhealth diagnostic center)**.



**Figure 2**. **Organ distribution of cases in patients with upper abdominal pain and their Frequency (beaconhealth diagnostic center)**.



**Figure 3**. **Organ distribution of cases in patients with upper abdominal pain and their percentage (beaconhealth diagnostic center)**.



**Figure 4**. Sonographic findings in non-traumatic patients with upper abdominal pain and their gender distributions (beaconhealth diagnostic center).



**Figure 5**. Distribution of sonographic findings in patients with upper abdominal pain (funbell diagnostic center)



**Figure 6: Organs distribution of cases in patients with upper abdominal pain and their percentages (Funbell diagnostic centers).**



**Figure 7: sonographic findings in patients with upper abdominal pain and their gender distribution**



**Figure 8: Age distribution of sonograptic findings in non- traumatic patients with upper abonminal pain (beaconhealth and funbell diagnostic centers)**



**Figure 9: organ distributions of cases in patients with upper abdominal pain and their percentages (beaconhealth and funbell diagnostic centers)**



**Figure 10: organ distribution of cases in gender of patients with upper abdominal pain and their percentages (beaconhealth and funbell diagnostic centers)**



**Figure 11: Sonographic findings in the liver and their gender distribution in patients with upper abdominal pain (beaconhealth and funbell diagnostic centers)**



**Figure 12: Sonographic findings in the kidney and their gender distributions (beaconhealth and funbell diagnostic centers)**



**Figure 13: Sonographic finding in the gall bladder and their gender distributions (beaconhealth and funbell diagnostic centers)**



**Figure 14: sonographic findings in non-traumatic patients with upper abdominal pain and their gender distributions (beaconhealth and funbell diagnostic centers)**

**4. DISCUSSION**

It can be shown that most common findings at Beaconhealth diagnostic center were hepatitis 23(20.72%), followed by Fatty liver 19(17.12%) and cholelithiasis 13(11.71%) while at Life chart scanning centre were pyelonephritis 30(24.00%), followed by fatty liver 22(17.60%) hepatitis 13(10.40%). In general the most common findings were Fatty liver 41 (17.37%) followed by Hepatitis 36(15.25), pyelonephritis 30(12.71%), and cholelithiasis 20(8. 47%) and this is in agreement with the work done by Mir Ali et al**12**. which shows that the most common cause of upper abdominal pain was Fatty liver. It was also found that at Beaconhealth diagnostic center 21- 25 years age group were mostly affected with upper abdominal pain, followed by 16 – 20 years age group and 31 – 35 years age group while at Life chart, it were 31-35 years age group followed by 26 -30 years age group and 36 – 40 years age group. In both it were 31 – 35 years age group followed by 21 – 25 years age group and 26 – 30 years age group. This study also showed that females 139 (58 .89%) were mostly affected with upper abdominal pain than males 97(41.10%).These findings does not agree with the unpublished research done by Okike ikenna10 which showed that 61-70years age group were mostly affected with abdominal pain and 81-90years group were the least affected and females were mostly affected.The variability in these results may depend on some factors like the pathology of interest, the geographical location where the scanning was done and the competency of the sonographer. The study indicates that the most common pathologies causing upper abdominal pain are fatty liver, hepatitis, pyelonephritis, and hydronephrosis. It also shows that the liver, kidneys, and gallbladder are the organs most frequently affected in these cases. The age groups most commonly experiencing upper abdominal pain are 31-35 years, 21-25 years, and 26-30 years. Additionally, the study reveals that females are more often affected by upper abdominal pain than males, and it notes a significant number of patients without recorded ages in their files.

**5. CONCLUSION**

In conclusion, I suggest that the use of ultrasound should be encouraged in diagnosing upper abdominal pain. It should be encouraged to be used as a first modality in diagnosis of patients with upper abdominal pain.

**REFERENCES**

Abdel-Misih, S., &Bloomston, M. (2010). Liver Anatomy. *The Surgical Clinics of North America*, *90*, 643–653. https://doi.org/10.1016/j.suc.2010.04.017

Ahn, S. H., Mayo-Smith, W., Murphy, B., Reinert, S., &Cronan, J. (2002). Acute Nontraumatic Abdominal Pain in Adult Patients: Abdominal Radiography Compared with CT Evaluation1. *Radiology*, *225*, 159–164. https://doi.org/10.1148/radiol.2251011282

Alessandrino, F., Ivanovic, A., Souza, D., Chaoui, A., Djokic-Kovac, J., &Mortele, K. (2019). The hepatoduodenal ligament revisited: cross-sectional imaging spectrum of non-neoplastic conditions. *Abdominal Radiology*, *44*. https://doi.org/10.1007/s00261-018-1829-0

Alkadarou, T., Musa, A., Alkadarou, A., Mahfouz, M. S., Troye-Blomberg, M., Elhassan, A. M., & Elhassan, I. M. (2013). Immunological characteristics of hyperreactive malarial splenomegaly syndrome in sudanese patients. *Journal of Tropical Medicine*. https://doi.org/10.1155/2013/961051

Allemann, F., Cassina, P. C., Röthlin, M. A., &Largiadèr, F. A. (1999). Ultrasound scans done by surgeons for patients with acute abdominal pain: a prospective study. *The European Journal of Surgery = Acta Chirurgica*, *165 10*, 966–970. https://api.semanticscholar.org/CorpusID:31371452

Anders, H.-J., Kitching, A. R., Leung, N., &Romagnani, P. (2023). Glomerulonephritis: immunopathogenesis and immunotherapy. *Nature Reviews Immunology*, *23*(7), 453–471. https://doi.org/10.1038/s41577-022-00816-y

Ang, E., Gluncic, V., Duque, A., Schafer, M., &Rakic, P. (2006). Prenatal exposure to ultrasound waves impacts neuronal migration in mice. *Proceedings of the National Academy of Sciences of the United States of America*, *103*, 12903–12910. https://doi.org/10.1073/pnas.0605294103

Bakhieta, I. A. (2003). . Sonographic Findings in Sudenese Children with Sickle Cell Anaemia. . *Journal of Dragnostic Medical Sonography*.

Belyayeva, M., Leslie, S., &Jeong, J. (2024). Acute Pyelonephritis. *[Updated 2024 Feb 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.*

Bozkurt, E., Sijberden, J., & Abu Hilal, M. (2022). What Is the Current Role and What Are the Prospects of the Robotic Approach in Liver Surgery? *Cancers*, *14*, 4268. https://doi.org/10.3390/cancers14174268

Bricker, L., Garcia, J., Henderson, J., Mugford, M., Neilson, J., Roberts, T., & Martin, M. A. (2000). Ultrasound screening in pregnancy: A systematic review of the clinical effectiveness, cost-effectiveness and women’s views. *Health Technology Assessment (Winchester, England)*, *4*, 1, i–vi. https://doi.org/10.3310/hta4160

Čarovac, A., Smajlovic, F., &Junuzovic, D. (2011). Application of Ultrasound in Medicine. *Acta Informatica Medica : AIM : Journal of the Society for Medical Informatics of Bosnia & Herzegovina : ČasopisDruštva Za MedicinskuInformatiku BiH*, *19*, 168–171. https://doi.org/10.5455/aim.2011.19.168-171

Case, T. D. (1998). ULTRASOUND PHYSICS AND INSTRUMENTATION. *Surgical Clinics of North America*, *78*(2), 197–217. https://doi.org/https://doi.org/10.1016/S0039-6109(05)70309-1

Chamli, A., Aggarwal, P., & Jamil, R. (2024). Hemangioma. *[Updated 2023 Jun 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing;*

Chaudhry, S., Liman, M., & Peterson, DC. (2024, January). *Anatomy, Abdomen and Pelvis: Stomach.* In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; .

Cheng, J., Wu, J., Ye, Y., Zhang, C., Zhang, Y., & Wang, Y. (2016). The prognostic significance of extramural venous invasion detected by multiple-row detector computed tomography in stage III gastric cancer. *Abdominal Radiology*, *41*. https://doi.org/10.1007/s00261-015-0627-1

Cobbold, R. S. C. (2007). *Foundations of Biomedical Ultrasound*. Oxford University Press. https://books.google.com.ng/books?id=NVJRAAAAMAAJ

Coffin, A., Boulay-Coletta, I., Sebbag-Sfez, D., & Zins, M. (2014). Radioanatomy of the retroperitoneal space. *Diagnostic and Interventional Imaging*, *96*. https://doi.org/10.1016/j.diii.2014.06.015

Cyoyal, M. (2004). The Correlation of Ultrasound Findings in Cases of Abdominal Pain. *Indian Head Forensic* .

Deverson, S., Evans, D., &Bouch, D. C. (2000). The effects of temporal bone on transcranial Doppler ultrasound beam shape. *Ultrasound in Medicine & Biology*, *26*, 239–244. https://doi.org/10.1016/S0301-5629(99)00129-5

Díaz Agurto, L., Contador, R., Albrecht, H., Urrutia, P., Bencze, B., Toro, M., Sáenz-Ravello, G., &Végh, D. (2024). Clinical Applications of Ultrasound Imaging in Dentistry: A comprehensive literature review. *Dentistry Review*, *4*, 100086. https://doi.org/10.1016/j.dentre.2024.100086

El-Reshaid, W., & Abdul-Fattah, H. (2014). Sonographic Assessment of Renal Size in Healthy Adults. *Medical Principles and Practice : International Journal of the Kuwait University, Health Science Centre*, *23*. https://doi.org/10.1159/000364876

Gapp, J. T. A. C. S. (2023, February 9). *Acute Pancreatitis*. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.

Gapp, J., Tariq, A. and, & Chandra, S. (2023). Acute Pancreatitis. *[Updated 2023 Feb 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-*.

Gupta, L. C. and, &Sahu, U. C. ,. (2007). Diagnostic Ultrasound . *New Delhi Medical  Publishers (P) Limited.*

Hassani, N. (2011). *Ultrasonography of the Abdomen*. Springer New York, NY.

Heikkile, k. , Vuokiaa, E. and, &Ossava, K. ,. (2011). Handedness in the Helsinki Ultrasound Trial. *Ultrasound in Obstetrics and  Gynecology.*

Hoskins, P., &McDicken, W. (1997). Colour ultrasound imaging of blood flow and tissue motion. *The British Journal of Radiology*, *70*, 878–890. https://doi.org/10.1259/bjr.70.837.9486063

Hosoda, K., Watanabe, M., & Yamashita, K. (2018). Re‐emerging role of macroscopic appearance in treatment strategy for gastric cancer. *Annals of Gastroenterological Surgery*, *3*. https://doi.org/10.1002/ags3.12218

Hundt, M., Wu, C., & Young, M. (2023, July 23). *Anatomy, Abdomen and Pelvis: Biliary Ducts.*StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL).

Imran, S. (2003). Accuracy of ultrasound in the diagnosis of upper abdominal pain. *Journal of Ayub Medical College, Abbottabad : JAMC*, *15*, 59–62.

Jeffrey, R. B., & Ralls, J. (1995). Sonography of the Abdomen. *Raven Press, Ltd., New York,* 204.

Jones, M., Gnanapandithan, K., &Panneerselvam, D. (2023). Chronic Cholecystitis. *In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan*.

Jones, M., Hannoodee, S., & Michael. (2019). *Anatomy, Abdomen and Pelvis, Gallbladder - StatPearls - NCBI Bookshelf*.

Jones, M., Weir, C., &Ghassemzadeh, S. (2023). Gallstones (Cholelithiasis). *In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan*.

Keiler, H. (2001). Sinistrality-a Side Effect of  Prenatal Sonography: A Comparative Study  of Young Men. . *Epidemiology.*

Kellum, J. A., Romagnani, P., Ashuntantang, G., Ronco, C., Zarbock, A., & Anders, H.-J. (2021). Acute kidney injury. *Nature Reviews Disease Primers*, *7*(1), 52. https://doi.org/10.1038/s41572-021-00284-z

Kim, D., &Pickhardt, P. (2012). Diagnostic Imaging Procedures in Gastroenterology. In *Goldman’s Cecil Medicine: Twenty Fourth Edition* (Vol. 1, pp. 845–850). https://doi.org/10.1016/B978-1-4377-1604-7.00135-4

Kline, T., Zamir, M., &Ritman, E. (2011). Relating Function to Branching Geometry: A Micro-CT Study of the Hepatic Artery, Portal Vein, and Biliary Tree. *Cells, Tissues, Organs*, *194*, 431–442. https://doi.org/10.1159/000323482

Leslie, S., Sajjad, H., & Murphy, P. (2024). Renal Calculi, Nephrolithiasis. *[Updated 2024 Apr 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.*, *4*.

Lung, K. and, & Lui, F. (2023, July). *Anatomy, Abdomen and Pelvis: Arteries.*StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Jul 24, 2023.

Mahatme, U., Meshram, A., Dongre, S., Nakhate, S., &Tabhane, V. (2015). Applications of Ultrasound in Medical Science: A Review. *IJSR*, 134–144.

Merritt, C. R. (2008). Ultrasound Safety: What are the Issues? *Radiology*, *173*(2), 304–306.

Michael, J. B. D. O. C. (2011). *Clinical Ultrasound* (Third).

Mir, A. P., Latfu, S. and, & Tuba, T. (2000). Clinical pattern and Abdominal Sonographic Findings in 251 Cases of Brucellosis. *Journal of Diagnostic  Medical Sonography*, *5*(2), 276–280.

Mozzini, C., Pesce, G., Casadei, A., Girelli, D., &Soresi, M. (2019). Ultrasound as First Line Step in Anaemia Diagnostics. *Mediterranean Journal of Hematology and Infectious Diseases*, *11*, e2019066. https://doi.org/10.4084/mjhid.2019.066

Nelwan, M. L. (2019). Schistosomiasis: Life Cycle, Diagnosis, and Control. In *Current Therapeutic Research - Clinical and Experimental* (Vol. 91, pp. 5–9). Excerpta Medica Inc. https://doi.org/10.1016/j.curtheres.2019.06.001

Okike, I. F. (2010). Analysis of Sonographic FindingsinPatientwith Abdominal pain. *A Project in Department of Medical Radiography,University of Nigeria , Enugu Campus.*, 1–50.

Oraevsky, A. (2014). *Optoacoustic Tomography: From Fundamentals to Diagnostic Imaging of Breast Cancer* (pp. 715–757). https://doi.org/10.1201/b17289-24

Palmer, P. E. S. ,. (2000). Manual of Diagnostic Ultrasound. *Edited by, University of California USA.*

Petrosyan, A., Cravedi, P., Villani, V., Angeletti, A., Manrique, J., Renieri, A., De Filippo, R. E., Perin, L., & Da Sacco, S. (2019). A glomerulus-on-a-chip to recapitulate the human glomerular filtration barrier. *Nature Communications*, *10*(1), 3656. https://doi.org/10.1038/s41467-019-11577-z

Raman, S. I. (2003). Are we Overusing Ultrasound in Ultrasound in Non-Traumatic  Acute Abdominal Pain. . *Postgraduate Medical Journal.*

Roman, S., Somaster k., and, & Lewis M. H. (2004). Ultrasound in Non Traumatic Acute Abdominal Pain . *Postgraduate Medical Journal*.

Salihefendic, N., Spahovic, H., Cabric, E., &Hrgovic, Z. (2009). Social and Medical Yield and Consequences of Ultrasonography in Primary Health Care. *Acta Informatica Medica, Sarajevo.*, *17*, 32.

Salvesen, R. (2011). Ultrasound in Pregnancy and Non-right Handedness; Meta- Analysis of Randomized Trials. *Ultrasound in Obsletrics& Gynecology*.

Sanders, R. C., & Miner, N. S. (1998). *Clinical Sonography: A Practical Guide*. Lippincott-Raven. https://books.google.com.ng/books?id=LjRMPgAACAAJ

Schaefer, T., & John, S. (2023). Acute Hepatitis. *[Updated 2023 Jul 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.* .

Shaikh, H., Wehrle, C., &Khorasani-Zadeh, A. (2023). Anatomy, Abdomen and Pelvis: Superior Mesenteric Artery. *StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Jul 24, 2023.*

Sinan, T., Leven, H., & Sheikh, M. (2003). Is fasting a necessary preparation for abdominal ultrasound? *BMC Medical Imaging*, *3*, 1. https://doi.org/10.1186/1471-2342-3-1

Skoczylas, K., &Pawełas, A. (2015). Badanieultrasonograficznewątrobyidrógżółciowych – oczekiwaniaklinicysty. *Journal of Ultrasonography*, *15*(62), 292–306. https://doi.org/10.15557/JoU.2015.0026

Speets, A. M. (2004). *Upper Abdominal Ultrasound in General Practice: Indications, Diagnostic Field, and Consequences for Patients Management.* .

Stephen J, Schueler, J., & Han R. (2010). Upper Abdominal Pain Underlying Cause . *CopyrightDSHI System, Inc Powered*, 32–70.

Stieger-Vanegas, S. (2021). *POCUS: Musculoskeletal – Soft Tissue* (pp. 647–661). https://doi.org/10.1002/9781119461005.ch34

Thotakura, R. and, & Anjum, F. (2023). Hydronephrosis and Hydroureter. *[Updated 2023 Apr 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan*, *4*.

Thulkar, O. S. (2000). Sonographic Findings in Grade III DenugueHemorrhgic Fever in Adults. . *J. Clin Ultrasound*.

Tirkes, T., Sandrasegaran, K., Patel, A., Hollar, M., Tejada, J., Tann, M., Akisik, F., &Lappas, J. (2012). Peritoneal and Retroperitoneal Anatomy and Its Relevance for Cross-Sectional Imaging. *Radiographics : A Review Publication of the Radiological Society of North America, Inc*, *32*, 437–451. https://doi.org/10.1148/rg.322115032

Ugwuanyi, D., Daniel, Chiegwu, H., Eze, C., &Ogbu, S. (2017). Sonographic findings in patients with upper abdominal pain in Nnewi community, Anambra State, Nigeria. *International Journal of Current Research*, *3*, 89–97. https://doi.org/10.22192/ijcrms.2017.03.06.012

Venkatakrishna, S. S., Onyango, L., Serai, S., &Viteri, B. (2023). *Kidney Anatomy and Physiology* (pp. 3–12). https://doi.org/10.1007/978-3-031-40169-5\_1

Vernon, H., Wehrle, C. and, & Alia, V. (2022, November 26). *Anatomy, Abdomen and Pelvis: Liver*. StatPearls [Internet]. .

Wade, C. and S. MJ. (2023, July). *Anatomy, Abdomen and Pelvis: Abdomen*. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. .

Wanda, M. H., & Matthew, A. W. (2010). *Fundamentals of Toxicologic Pathology* (2nd ed.).

Wibulpolprasert, B. and, &Hiensiri, T. D. (1999). Visceral Organ Abscesses in Melioodosis: Sonographic Findings. *J. Clin Ultrasound*.

Wolf, D. C. (1990). *94 Evaluation of the Size, Shape, and Consistency of the Liver*.

Zhang, J. L., Rusinek, H., Chandarana, H., & Lee, V. (2013). Functional MRI of the kidneys. *Journal of Magnetic Resonance Imaging : JMRI*, *37*, 282–293. https://doi.org/10.1002/jmri.23717