



**SPECTRUM OF SONOGRAPHIC FINDINGS AMONG ADULT NON-TRAUMATIC PATIENTS WITH UPPER ABDOMINAL PAIN WITHIN SOKOTO METROPOLIS.**

**Abubakar U<sup>1</sup>, Adamu Y<sup>\*2</sup>, Yunusa G. H<sup>3</sup>, Mohammed A. G<sup>1</sup>, Mohammed D<sup>1</sup>, Audu A. S<sup>1</sup>, Mohammed A<sup>1</sup>, Izge Y. I<sup>1</sup> and Gurama D. A<sup>1</sup>.**

<sup>1</sup>Department of Radiography, Faculty of Allied Health Sciences, College of Health Sciences, Usmanu Danfodiyo University, SokotoNigeria

<sup>2</sup>Department of Medical Radiography, Faculty of Health Sciences, College of Medicine, Federal University of Lafia, Nasarawa State, Nigeria.

<sup>3</sup>Department of Radiology, Faculty of Clinical Sciences, College of Health Sciences, Usmanu Danfodiyo University, SokotoNigeria.

\*Corresponding author: [radcomradeay2015@gmail.com](mailto:radcomradeay2015@gmail.com), +2348036350002

ARTICLE INFO

**Keywords:**

Ultrasonography,  
Upper Abdominal  
pain, Adult  
Patients, UDUTH,  
Sokoto.

ABSTRACT

**Introduction:** Abdominal ultrasonography is a non-invasive imaging procedure that evaluates the abdominal organs, including the kidney, liver, gallbladder, spleen, and other internal organs. It can reveal conditions like abdominal aortic aneurysm, abscess, cholecystitis, gallstone, hydronephrosis, kidney stones, splenomegaly, and pancreatitis. Upper abdominal pain is primarily caused by chronic and acute illnesses, with peptic ulcer disease, Gallstones, and Liver diseases being the common cause.

**Objectives:** To investigate the pattern of ultrasound findings in non-traumatic patients with upper abdominal pain about age and gender.

**Method:** A retrospective study was conducted where 198 ultrasound reports of patients in UDUTHs and SHS from 2019-2021 were reviewed. The data was collected from existing reports in the retrieved files. The following data were collected from the patients' reports: gender, age, and ultrasound report/diagnosis. Data were analyzed, descriptive statistics were calculated and tabulated for the study.

**Results:** Results obtained from this study showed that patients within the age group of 21-25 had the highest presentation of upper abdominal pain with a percentage of 13% and the least were 71-75 age group with 3%.

**Conclusions:** The spectrum of findings by ultrasound in non-traumatic patients with upper abdominal pain in UDUTHs and SHS was hepatomegaly.

## Background

Abdominal ultrasonography is a quick, non-intrusive assessment procedure that provides an overview of the abdomen organs [1]. It is an imaging procedure used to assess the kidney, liver, gallbladder, spleen, and other internal organs of the abdomen. Ultrasound can also be used to also assess the blood vessels that connect to some of these organs [2]. Ultrasound can reveal many possible conditions including abdominal aortic aneurysm, abscess, cholecystitis, gallstone, hydronephrosis, kidney stones; splenomegaly, and pancreatitis [3].

Chronic and acute illnesses of the liver, gallbladder, kidneys, pancreas, stomach, duodenum, spleen, pleura pericardium, and basal lung segments are the main causes of upper abdominal pain [4]. When the symptoms of peptic ulcer disease intensify, it may be a sign of a complication such as perforation or penetration. Upper abdominal pain is frequently caused by peptic ulcer disease [5, 6]. Infections, neoplasms, and infiltrative illnesses are among the differential diagnoses for upper abdominal pain accompanied by ulcers in the stomach or duodenum. Gallstones and alcohol are the most prevalent causes of acute upper abdominal pain worldwide, however, infectious etiologies are relevant in those who are immune-compromised. Acute pancreatitis is another cause of this discomfort [4, 6, and 7].

To reduce bowel gas that could obstruct the image and keep the gallbladder filled with bile, which makes it easier to visualize its contents, the patient will be asked to fast overnight or for at least six hours before the ultrasonography of the liver, pancreas, gallbladder, or digestive tract [1, 5]. The patient will be given water to drink right before the test if the stomach or duodenum is being examined because these organs are easier to see when they are full of fluids [1, 4].

Upper abdominal pain is one of the commonest reason patients go for an ultrasound examination, nevertheless, several works have been conducted on the spectrum of findings on ultrasound among patients with UAP. However, to the best of the researcher's knowledge, no published research work is done in the Sokoto metropolis on the spectrum of ultrasound findings among non-traumatic adult patients with upper abdominal pain, and this will definitely and negatively affect sonography practice in the management of upper abdominal pain in the study location. Findings from this study will give sonographers and sonologists the common sonographic UAP findings in patients of this locality. Also, the findings will serve as a guide to physicians in making provisional diagnoses for patients that come with UAP based on gender and age-related findings of the study in areas where there is no access to ultrasound. This study is aimed at finding the spectrum of ultrasound findings in patients with upper abdominal pain.

## Materials and Methods

A retrospective research design was adopted for the study. The study was conducted at Usmanu Danfodio University Teaching Hospital (UDUTH) and State Specialist Hospital Sokoto. In line with Helsinki Declaration, ethical approval was obtained from the Health Research Ethics Committee (HREC) of Usmanu Danfodio University Teaching Hospital Sokoto. A secondary source of data was used for this study. Ultrasound reports of patients who underwent ultrasonography because of upper abdominal pain between 2019 and 2021 were included in the target population. A convenient sampling technique was adopted for the study.

The sample size was calculated using the formula for determining sample size for a finite population by Taro Yamane:

$$n = \frac{N}{1+N(e)^2}$$

Where;

n = the desired sample size

N = the population size.

e = maximum acceptable sampling error.

1 = constant.

Thus N=392, e=0.05

$$n = \frac{392}{1 + 392(0.05)^2} = 198$$

All ultrasound reports of patients between the ages of 16-85 with indications of upper abdominal pain were retrieved. Pregnant women with a history of upper abdominal pain and all cases with a history of lower abdominal pain were excluded from the study. The data was collected from already existing reports. Microsoft Office was used for the descriptive analysis to obtain the mean, frequency, and percentages of the participants.

## Results

**Table 1 Frequency and percentage distribution of subjects according to their age group.**

Age group	Frequency	Percentage
16-20	15	7.6%
21-25	26	13.1%
26-30	12	6.1%
31-35	14	7.1
36-40	20	10.1%
41-45	9	4.5%
46-50	14	7.1%
51-55	16	8.1%
56-60	10	5.1%
61-65	12	6.1%
66-70	8	4.0%
71-75	6	3.0%
76-80	8	4.0%
81-85	9	4.4%
Patients without age	20	10.1%
TOTAL	198	100%

**Table 2 Gender distribution of affected organs in patients with UAP.**

Organ	Male	Female	Frequency	Percentage
Liver	40	34	74	37.4%
Kidney	19	18	37	18.7%
Gallbladder	12	7	19	9.6%
Stomach	6	13	19	9.6%
Spleen	11	10	21	10.6%
Pancreas	4	3	7	3.5%
Normal studies	10	11	21	10.6%
TOTAL	102	96	198	100%

Figure 1. Bar chart representation of organ distribution and gender.

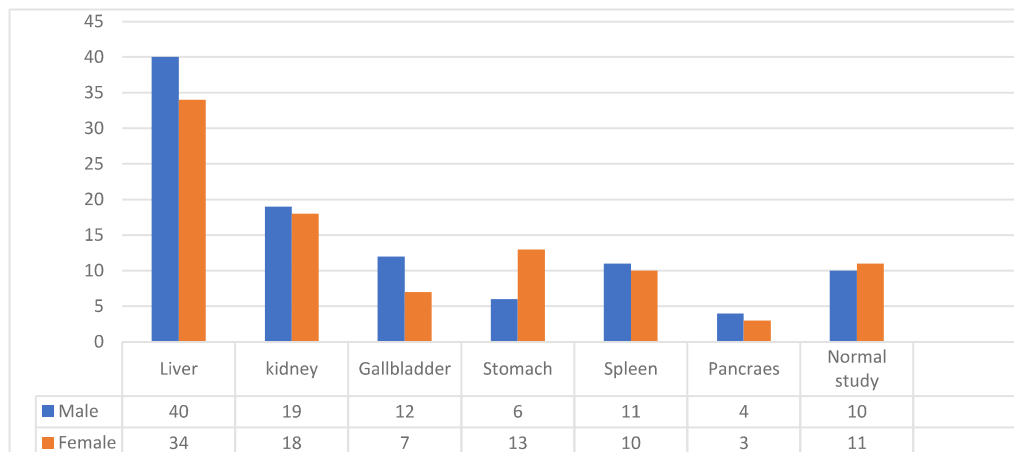
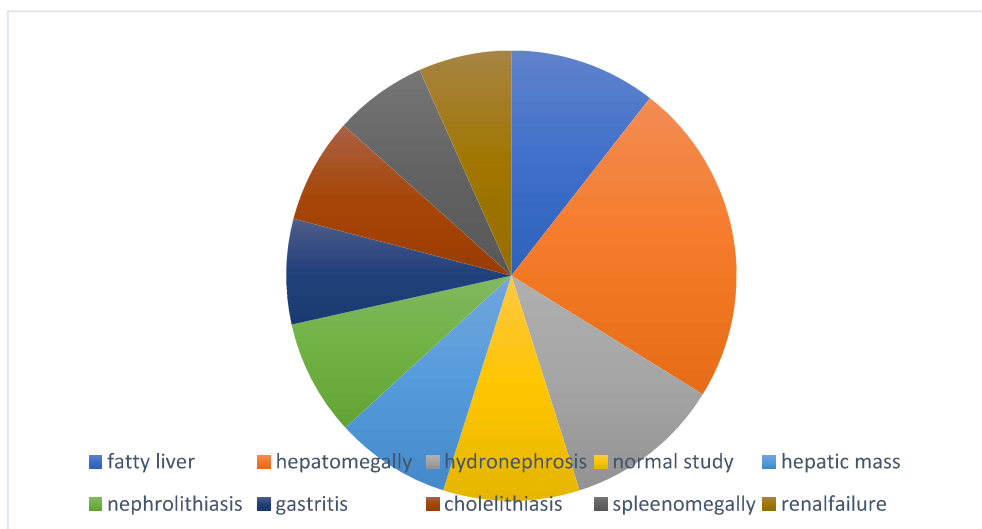


Table 3 Sonographic findings of patients with UAP

Sonographic findings	Male	Female	Frequency	Percentage
Fatty liver	8	6	14	7.1%
Liver cirrhosis	5	4	9	4.5%
Hepatomegaly	18	13	31	15.7%
Portal hypertension	4	3	7	3.5%
Hepatic mass	6	5	11	5.6%
Primary liver cell carcinoma(PLCC)	4	3	7	3.5%
Pancreatitis	1	0	1	0.5%
Hydronephrosis	8	7	15	7.6%
Grade I renal parenchyma disease	3	2	5	2.5%
Grade II renal parenchyma disease	2	4	6	3.0%
Nephrolithiasis	6	5	11	5.6%
Renal cyst	4	6	10	5.1%
Polycystic kidney	4	3	7	3.5%
Renal failure	4	5	9	4.5%
Renal carcinoma	2	3	5	2.5%
Gastritis	4	6	10	5.1%
Cholelithiasis	4	6	10	5.1%
Cholecystitis	4	3	7	3.5%
Splenomegaly	4	5	9	4.5%
Splenic mass	1	0	1	0.5%
Normal study	6	7	13	6.6%
<b>TOTAL</b>	<b>102</b>	<b>96</b>	<b>198</b>	<b>100%</b>

**Figure 2. A pie chart shows a representation of the most common pathologies of the upper abdominal organs**



### Discussion

This study included adult patients who came in for an ultrasound with upper abdominal pain, and the results revealed that the liver was the most affected organ, followed by the kidney, spleen, gallbladder, and stomach, with the pancreas being the least affected. This finding is in agreement with the research work done by Ugwuanyi in the Nnewi community, Anambra State Nigeria, and Abtehag of the National Cancer Center, Benghazi, Libya, who also reported that the liver was the most affected organ and the pancreas was the least [4, 7, and 8].

The findings of this study are, Hepatomegaly is the most common finding in adult non-traumatic patients with UAP and pancreatitis has the least finding. However, the finding of this study is in disagreement with the work of Ugwuanyi, Abtehag, and Speets, whose common spectrum of findings was fatty liver, but, in agreement with pancreatitis as the least common finding in patients with UAP [4, 7, 9, and 10]. Also, the finding of this study is in disagreement with the work of Ghimire of the Department of Radiology, Nepalgunj Medical College and Teaching Hospital, Kohalpur, Banke, Nepal, who also found Urolithiasis to be the most common finding in a patient referred for ultrasound examination with UAP [9, 11].

Furthermore, the 21-25 years age group was mostly affected by UAP and the least is in the 71-75 age group. However, the findings of Ugwuanyi disagree with this as the most common age group affected in their study as 56-60 years was the most affected age range, and 0-5 is the least affected age group [4, 6, and 12].

The finding of this study shows that the male gender has more incidence of UAP than females, which is in disagreement with the work of Ugwuanyi, Ghimire, and Abtehag [4, 9, and 7].

### Summary

Over 198 sonographic scan reports were retrieved all with a clinical history of upper abdominal pain. Males with a number 102 and 96 were female. Among them, the most common pathology is hepatomegaly, followed by hydronephrosis, gastritis, Cholelithiasis, and splenomegaly. Pancreatitis is the least. Also, the liver showed to be the most affected organ, while the pancreas was the least affected. Furthermore, the findings showed higher frequency in male than female patients.

However, the result showed that patients within the age range of 21-25 years age group were mostly affected by UAP with a percentage of 13%. The least is in the 71-75 age group with a percentage of 3.0%.

The variability in these results may depend on some factors like the pathology of interest, environmental factors, the geographical location where the scanning was done, and the competency of the sonographer.

### Limitations of the Study

- (1) The lack of incomplete patient information on the report card limited the study.
- (2) The lack of available data limited the scope of the study and the sample size due to the failure of the

hospitals to keep previous patients' records.

### Recommendation

- (1) The study should be replicated using a larger sample size.
- (2) The request card should be properly filled with more details.

### Area of Further Study

- (1) A spectrum of sonographic findings among children with upper abdomen pain.
- (2) Common sonographic findings among patients with flank pain.

### References

- [1] Ali 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.
- [2] Grainger and Allison., (2008). *Diagnostic Radiology: A Textbook of Medical Imaging*. 5th edition. York, NY: Churchill Living Stone. (3):432-48
- [3] Pickhardt P J., (2007). *Diagnostic Imaging Procedures in Gastroenterology*. Saunders Elsevier .pp. 923-985.
- [4] Ugwuanyi D C., Chiegwu H U., Eze C.U., Ogbu S., and Okeji M. (2017). Sonographic findings in patients with upper abdominal pain in Nnewi community, Anambra state, Nigeria. *International Journal of Current Research*. 3(6):89-97.
- [5] Stephen J. S and Han R. (2010). Upper Abdominal Pain Underlying Cause Copyright DSHI System, Inc Powered. pp. 32-70.
- [6] Xavier, R. J., & Thomas, H. J. (2013). Gastrointestinal Diseases. *Hunter's Tropical Medicine and Emerging Infectious Disease (Ninth Edition)*, 18-27. <https://doi.org/10.1016/B978-1-4160-4390-4.00003-5>
- [7] Bodalal, Z., Azzuz, R., & Bendardaf, R. (2014). Cancers in Eastern Libya: First results from Benghazi Medical Center. *World Journal of Gastroenterology*: 20(20), 6293-6301. <https://doi.org/10.3748/wjg.v20.i20.6293>
- [8] Speets AM., Hoes AW., Vandergraaf Y., Kalmijn S., de Wit NJ., Montauban van Swijndregt AD., Gratama JWC., Rutten MJCM. and Mali WP., (2006) Upper abdominal ultrasound in general practice: indications, diagnostic yield, and consequences for patient management. *Oxford Journals* 23: 507–511.
- [9] Ghimire P., Paudel., Koirala D., and Singh B (2018) Implications of ultrasonography in the diagnosis and management of patients presenting with non-traumatic acute abdominal pain in a tertiary hospital of the mid-western region of Nepal. *Nepalese Journal of Radiology*; 8 (12):30-34.
- [10] Alleman F., and Tarnus G (1999). Ultrasound Scan Done by Surgeons for Patients with Acute Abdominal Pain, *European Journal of Surgeon*. 165 (10): 966-970.
- [11] Goldberg B., Gramaik R., and Freimanis A.K (1993) Early history of diagnostic ultrasound; the role of American radiologists. *American Journal of roentgenology* 160;189-194.
- [12] Imran S. and Ayub J (2003) Accuracy of ultrasound in the diagnosis of upper abdominal pain. 15(2):59-62.