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Characteristics of Patients with Abdominal Ultrasound Findings of Cholelithiasis at Dr. H. Chasan Boesoirie General Hospital in Ternate

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Abstract
Cholelithiasis, or gallstone disease, is a common gastrointestinal condition characterized by the formation of solid deposits in the gallbladder or bile ducts. Its global prevalence is approximately 3.2%, increasing with age and affecting women more frequently than men. Abdominal ultrasonography (USG) is the preferred imaging modality for initial diagnosis due to its safety, speed, and high sensitivity (approximately 95%) in detecting gallstones. This study aims to determine the characteristics of patients with abdominal ultrasound findings of cholelithiasis at Dr. H. Chasan Boesoirie General Hospital, Ternate City, during 2022-2024. A descriptive retrospective design was employed, using total sampling to include all 97 patients diagnosed with cholelithiasis via ultrasound during the study period. Data were collected from medical records and analyzed using descriptive statistics. The results showed that 49.5% of patients were aged 46-65 years, 60.8% were female, 52.6% presented with right upper quadrant abdominal pain, and 54.6% had no complications. In conclusion, cholelithiasis at this hospital predominantly affects middle-aged women, with right upper quadrant pain being the most common symptom and the majority of cases being uncomplicated. These findings provide a foundational epidemiological profile for the region.

INTRODUCTION

Cholelithiasis is one of the most common gastrointestinal disorders found in Western countries. About 10% of the adult population develops cholelithiasis in asymptomatic or asymptomatic conditions. The incidence rate of this disease is influenced by age, gender, and ethnic background. In general, the prevalence of cholelithiasis reaches 3.2%, but this figure tends to increase with age, especially in the age range of 21 to 80 years. In addition, the incidence of cholelithiasis was recorded higher in women than in men (Selvi *et al.* , 2011).

The prevalence of cholelithiasis varies between countries, geographical location and ethnicity of a country plays an important role in the incidence of cholelithiasis. In the United States, cholecystitis affects about 20 million individuals, which is equivalent to 10% to 20% of the adult population. Each year, 1% to 3% of people are diagnosed with cholelithiasis, with the same percentage showing clinical symptoms related to the condition. In addition, about 500,000 cases per year experience symptomatic manifestations or complications due to gallstones that require cholecystectomy as definitive treatment. Based on data from the (Heuman, 2019; Stinton *and* Shaffer, 2012). *Third National Health and Nutrition Examination Survey* (NHANES III), the prevalence of cholelithiasis in the United States reaches 7.9% in men and 16.6% in women. In the European region, surveys using ultrasound

methods show prevalence rates ranging from 5% to 15%. Meanwhile, in Asia in 2013, the prevalence of cholecystitis was recorded between 3% and 10%, with variations between countries. Recent data shows a prevalence of 3.2% in Japan, 10.7% in China, 7.1% in North India, and 5.0% in Taiwan (Chang, *et al*, 2013).

Ultrasound (ultrasound) is the most recommended imaging method for early diagnosis and screening in patients with complaints of upper right quadrant abdominal pain (biliary pain) (Kashyap et al., 2023; Mahadevan, 2020; Murphy et al., 2020). This technique was chosen because it is easy, safe, fast, and does not involve radiation exposure. In addition, ultrasound has a high level of specificity and sensitivity, reaching about 95% in detecting cholelithiasis (Selvi, *et al*, 2011).

The research conducted at the Koja regional general hospital found that as many as 87 patients were diagnosed with cholelithiasis with an average age of 45.6. The prevalence in female patients is more than in men (57.47%), with an average age over 40 years (80.46%). A total of 68.97% were patients sent from the inpatient room. The most clinical complaint found was dyspepsia (42.53%). Multiple cholelithiasis was the most ultrasound picture found (36.78%), where 73.56% of patients showed no complications and only 22.99% showed complications of cholecystitis (Ndraha *et al.*, 2018).

The urgency of this research is underscored by the critical role of Dr. H. Chasan Boesoirie General Hospital as the main referral hospital in North Maluku. Understanding the local patient demographics and clinical presentation is essential for effective resource allocation, clinical management, and public health planning in the region. The novelty of this study lies in its being the first investigation to describe the characteristics of patients with abdominal ultrasound findings of cholelithiasis at this specific hospital, providing crucial data that can guide future research and healthcare policies in this underserved area.

Based on research conducted previously at the Koja regional general hospital, there was a complication research variable with the most results not showing complications. Therefore, the researcher is interested in conducting this study to find out whether the results of this study are in line with previous research. Research on the characteristics of patients with cholelithiasis abdominal ultrasound results has never been conducted at Dr. H. Chasan Boesoirie Hospital. Therefore, the researcher is interested in conducting the study and it is hoped that the results of the study can provide information related to patients with the results of cholelithiasis abdominal ultrasound examination.

METHOD

This type of research was observational descriptive research with a retrospective approach. This study was conducted to look at the characteristics of patients with cholelithiasis abdominal ultrasound results at Dr. H. Chasan Boesoirie Hospital. This research was conducted at Dr. H. Chasan Boesoirie Hospital in December 2024 – January 2025. The inclusion criteria in this study were patients with a diagnosis of cholelithiasis who were examined by ultrasound at Dr. H. Chasan Boesoirie Hospital and adult cholelithiasis patients with variables such as age, sex, clinical symptoms, and complications.

Exclusion criteria that need to be considered include cholecystitis patients who did not have an ultrasound at Dr. H. Chasan Boesoirie Hospital and cholelithiasis patients with incomplete data on medical records. Data processing in this study begins with data collection

first, then collected in the form of a table using *Microsoft Excel*. The data that has been compiled is analyzed using SPSS with the aim of determining the frequency distribution descriptively.

RESULTS AND DISCUSSION

Table 1. Sample Distribution by Age

Age	Frequency (n)	Percentage (%)
18-25 years old	1	1
26-45 years old	39	40,2
46-65 years old	48	49,5
≥65 years old	9	9,3
Total	**97**	**100**

Based on the distribution of the age table above, it can be seen that patients diagnosed with cholelithiasis who did an abdominal ultrasound at Dr. H. Chasan Boesoirie Hospital, Ternate City, were found to be the most at the age of 46-65 years, namely as many as 48 samples with a percentage of 49.5%, the second most at the age of 26-45 years, which is as many as 39 samples with a percentage of 40.2%, then at the age of >65 years, which is as many as 9 samples with a percentage of 9.3% and the age of 18-25 years, which is 1 sample with a percentage of 1%.

Table 2. Sample Distribution by Gender

Gender	Frequency (n)	Percentage (%)
Male	38	39,2
Women	59	60,8
Total	**97**	**100**

Based on the distribution of the gender table above, it can be seen that patients diagnosed with cholelithiasis who performed an abdominal ultrasound at Dr. H. Chasan Boesoirie Hospital, Ternate City, were found to be the most in women, namely 59 samples with a percentage of 60.8% and in men as many as 38 samples with a percentage of 39.2%.

Table 3. Distribution of Samples by Clinical Symptoms

Clinical Symptoms	Frequency (n)	Percentage (%)
Upper right abdominal pain	51	52,6
Dyspepsia	6	6,2
Back Pain	6	6,2
Non-specific abdominal pain	19	19,6
Others	15	15,5
Total	**97**	**100**

Based on the distribution of the clinical symptoms table above, it can be seen that patients diagnosed with cholelithiasis who performed an abdominal ultrasound at Dr. H. Chasan Boesoirie Hospital, Ternate City, were found to have the most upper right abdominal pain, which was 51 samples with a percentage of 52.6%, non-specific abdominal pain, which was 19 samples with a percentage of 19.6%, other symptoms were 15 samples with a percentage of 15.5% and the lowest clinical symptoms were dyspepsia and low back pain, namely A total of 6 samples with a percentage of 6.2%.

Table 4. Sample Distribution by Complication

Complications	Frequency (n)	Percentage (%)
Pancreatitis	1	1
Cholecystitis	40	41,2
Others	3	3,1
None	53	54,6
Total	**97**	**100**

Based on the distribution of the complication table above, it can be seen that patients diagnosed with cholecystitis who did an abdominal ultrasound at Dr. H. Chasan Boesoirie Hospital, Ternate City, were found to have the most no complications, namely 53 samples with a percentage of 54.6%, cholecystitis, which was 40 samples with a percentage of 41.2%, other complications (obstructive jaundice) as many as 3 samples with a percentage of 3.1% and the lowest complication was pancreatitis, which was 1 sample. with a percentage of 1%.

Characteristics of Patients with Cholelithiasis Abdominal Ultrasound Results at Dr. H. Chasan Boesoirie Hospital, Ternate City

Age

Based on table 1, the results of the study found that cholelithiasis patients who performed abdominal ultrasound examinations at Dr. H. Chasan Boesoirie Hospital, Ternate City, were 46-65 years old with 48 samples (49.5%). This is in line with research conducted based on *literature reviews* related to 11 articles conducted with limitations from 2019-2023 found the highest prevalence of cholelithiasis at the age of >40 years (Wulandari *et al.,* 2023). This is also in line with research conducted at Hasanuddin University Hospital for the period January 2022-December 2022 which obtained the results of patients with the highest prevalence at the age of >50 years (Alfais *et al.,* 2023).

Age is one of the main risk factors in the development of gallstone disease. This condition is very rare in children, but its prevalence increases significantly with age, especially after the age of 40. This increase is largely due to the accumulation of gallstone formation over time, given that gallstones rarely undergo spontaneous dissolution. Physiologically, increasing age is associated with increased cholesterol secretion into bile as well as decreased bile acid production, which contributes to increased bile *lithogenicity*. In addition, the activity of the enzyme 7α-hydroxylase, which acts as *a rate-limiting enzyme* in the biosynthesis of bile acids from cholesterol, decreases with age. As a result, there is an increase in cholesterol saturation in bile, which increases the risk of cholelithiasis (Aji *et al.*, 2020; Azriyantha *et al.*, 2021).

Gender

Based on table 5.2, the results of the study found that cholelithiasis patients who performed abdominal ultrasound examinations at Dr. H. Chasan Boesoirie Hospital, Ternate City, the most were female as many as 59 samples (60.8%). This is in line with research conducted at Dr. H. Abdul Moeloek Hospital, Lampung Province in August 2020 which obtained the most results on the female gender with a percentage of 61.8% (Aji *et al*., 2020). This research is also in line with the research conducted at Moh Hospital. Ansari Saleh South Kalimantan in 2023 who received the most respondents in the female gender as many as 18 samples (56.25%) (Jamini *and* Trihandini, 2023).

Women have a three times higher risk of developing gallstones than men. This

increased risk is mainly due to the influence of the hormone estrogen, which can increase the secretion of cholesterol into bile, thereby increasing its *lithogenicity*. Pregnancy also contributes to the risk of cholelithiasis because elevated estrogen levels during gestation can trigger an increase in cholesterol saturation in the bile. In addition, the use of oral contraceptives as well as estrogen-based hormone therapy can worsen this condition by increasing cholesterol levels in the bile as well as decreasing gallbladder emptying activity, potentially leading to bile stasis and stone formation (Okumura et al., 2021). Another factor that plays a role is obesity, which is associated with increased cholesterol levels in bile and an increased risk of cholelithiasis. In addition, women with a family history of cholelithiasis also have a higher risk of developing this condition, which suggests the contribution of genetic factors in the pathogenesis of gallstone disease (Aji *et al.,* 2020; Jones *et al.,* 2024).

Clinical Symptoms

Based on table 5.3, the results of the study found that cholelithiasis patients who performed an abdominal ultrasound examination at Dr. H. Chasan Boesoirie Hospital, Ternate City, the most patients who had clinical symptoms of upper right abdominal pain were 51 samples (52.6%). This is in line with research conducted at Moh Hospital. Ansari Saleh South Kalimantan in 2023 who received the most results on clinical symptoms of upper right abdominal pain as many as 25 samples (78.13%) (Jamini *and* Trihandini, 2023). However, this study is not in line with the research conducted at Koja Hospital which obtained the most results of patients with clinical symptoms of dyspepsia as many as 61 samples (60%) (Febyan *et al*., 2017).

Patients with gallstones generally come with biliary colic complaints, which are intermittent abdominal pain that is constant, sharp, and localized in the upper right abdomen. This pain is often accompanied by additional symptoms such as nausea, vomiting, and diaphoresis. Pain in biliary colic occurs as a result of the contraction of the gallbladder in response to stimuli that force gallstones to pass through or enter the mouth of the cystic duct. This process causes an increase in pressure on the walls of the gallbladder, which gives rise to a characteristic pain. However, when the gallbladder is in a relaxed state, the stones can re-enter the lumen of the gallbladder, so the pain can subside within 30 to 90 minutes. Patho physiologically, pain in cholecystic patients arises due to obstruction of bile flow when stones move into the bile ducts and cause obstruction, which can eventually trigger inflammation and other complications (Jamini *and* Trihandini, 2023).

Complications

Based on table 5.3, the results of the study found that cholelithiasis patients who performed an abdominal ultrasound examination at Dr. H. Chasan Boesoirie Hospital, Ternate City, the most patients with no complications were 53 samples (54.6%). This is in line with a study conducted at Koja Hospital in 2014 which found that the most patients did not have complications as many as 64 samples (73.6%) (Ndraha *et al*., 2014). The same thing was obtained in a study at RSS West Jakarta in January-December 2019 which obtained results in the most *cholelysiasis* patients without complications, namely with a percentage of 76.47% (Gunawan *and* Andrew, 2024).

Cholecystitis can progress to a variety of serious complications, including cholecystitis, cholangitis, cholelithiasis, pancreatitis, and in less common cases, cholangiocarcinoma. These symptoms and complications generally appear when gallstones cause an obstruction of

the cystic duct, bile duct, or both. Persistent cystic duct obstruction, especially if large stones are permanently stuck in the neck of the gallbladder, can lead to acute cholecystitis due to increased pressure and inflammation. If the stone migrates into the communist biliary duct, an obstruction can occur that causes jaundice. In some cases, external pressure on the communist hepatic duct due to stones localized in the neck of the gallbladder or cystic duct can trigger Mirizzi syndrome, a rare condition that can lead to biliary obstruction. In addition, the migration of stones into the communist biliary duct can increase the risk of developing acute pancreatitis (Mohy-ud-din & Morrissey, 2023). It is thought to occur as a result of a temporary obstruction of the main pancreatic duct when the stone passes through the area of the ampule Vater, which disrupts the flow of pancreatic enzymes and triggers pancreatic inflammation (Tanaja *et al.,* 2023; Nicht, 2013)

CONCLUSION

The research conducted on patients with cholecystic abdominal ultrasound results at Dr. H. Chasan Boesoirie Hospital, Ternate City, can be concluded that: The most age was found in the age group of 46-65 years with the results of 48 samples (49.5%). A large number of genders were found in the female group with the results of 59 samples (60.8%). Most clinical symptoms were found in complaints of upper right abdominal pain with the results of 51 samples (52.6%). Most of the samples were found to have no complications with the results of 53 samples (54.6%).

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