

Distribution and Treatment of Hepatitis C in Libyan Population

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ABSTRACT

Viral hepatitis refers to inflammation of the liver that is caused by viral infection. It is a major public health issue in the world wide. Not only does viral hepatitis carry a high morbidity, but it also stresses medical resources and can have severe economic consequences.

The majority of all viral hepatitis cases are preventable. HCV infection is rarely diagnosed during the acute phase of infection. Although a variety of host-factors play a role in eradication of HCV, only 15%-25% of adults spontaneously clear the infection.

The objective: Distribution of hepatitis C virus and the incidence rate between males and females in Libya. What are causes, symptoms and complications of hepatitis C virus infection. How to diagnose hepatitis C virus infection in the lab.

A total of 64 anti-HCV positive serum samples from individuals of physical examination were recruited from the Tripoli central Hospital infectious department Tripoli from January 2023 to June 2023. 64 samples with a positive PCR for HCV RNA. The age of anti-HCV positive individuals of physical examination ranged from 20 to 90 years old.

Through the results, we find that the number of male cases is 42 for 65.62%, and the number of female cases is 22; with a rate of 34.37%. The age group (50-59) year was 23 cases with a rate of 35.93%. No cases of a Decrease of WBC, and we found that most of the cases had normal rate of WBC 19 cases by 86.3%, and 3 cases had increase rate of WBC by 13.6%.

In conclusion, we conclude that men are more infected with hepatitis C. Also, the most age group infected with hepatitis C is (50-95), and this is not a good indicator and should be alerted.

Acronyms

- **HCV:** Hepatitis C virus.
- **PCR:** Polymerase chain reaction.
- **ALT:** Alanine aminotransferase.
- **AST:** Aspartate transferase.
- **BIL:** Total bilirubin.

INTRODUCTION

Viral hepatitis C (HCV) is a major public health issue in the world wide. Not only does viral hepatitis carry a high morbidity, but it also stresses medical resources and can have severe economic consequences. The majority of all viral hepatitis cases are preventable (Stasi et al., 2024).

HCV infection is rarely diagnosed during in the acute phase of infection. Although a variety of host-factors play a role in eradication of HCV, only 15%-25% of adults spontaneously clear the infection. The remaining of patients continue to have persistent viremia and retrospective studies on the natural history of HCV infection, have found that about 15%-30% of people with chronic infection would progress to cirrhosis over the duration of two to three decades (Liu and Kao, 2023; Niu et al., 2017).

Progression to cirrhosis has been shown to occur at an accelerated pace in those with concomitant alcohol use (> 50 g/d), coinfection with HIV and hepatitis B virus (HBV), as well as male sex, and older age at time of infection (Streiff et al., 2002).

The HCV is a major cause of hepatitis (acute and chronic) and cirrhosis the world over. According to the centers for Disease Control and prevention, Infection with hepatitis C almost results in chronic infection. Sixty-seven percent of all cases develop chronic liver disease with accompanying elevation of liver enzymes. Hepatitis C viral infection is also thought to be a major contributing factor to hepatocellular Carcinoma (Streiff et al., 2002). Discovered in 1990 as a causative agent for post-transfusion Non-A, non-B hepatitis, 2.7million of the population is now suffering from Hepatitis C infection (Lingala and Ghanys, 2015). There are Approximately 30,000 new cases of acute hepatitis C diagnosed each Year in the United States (Alter et al., 1994).

To date, most hepatitis C studies have focused on blood transfusion as the major source of viral transmission. However, the most infections are acquired outside this setting. the previous Studies, which are conducted by the centers for Disease Control and Prevention in 1992, revealed 4% of cases of acute hepatitis C were associated with blood transfusions; 29% of cases were associated with injection drug use; 2% with exposure to blood in the work place; 12% with exposure to sexual contacts or household contacts who were infected; and 46% with low socioeconomic level or other high-risk characteristics. In many patients, no specific source is identified (Henriot et al., 2022).

Viral hepatitis may develop without clinical signs or symptoms. However, nonspecific symptoms may appear for a short time with or without jaundice; these symptoms may vary from nonspecific flu-like symptoms to fatal liver failure (Chen and Morgan, 2006; Myhre and Sifris, 2023). Diagnosis of viral hepatitis often depends on an accumulation of findings considered together. Early in the disease process, generally called the prodromal phase, some patients experience a serum-type sickness that may include fever, arthralgia, Arthritis, rash, and edema. These symptoms usually occur 2-3 weeks before jaundice and generally subside before develops (Wilkins et al., 2010), although in some cases they may be concomitant with its appearance. In the pre-icteric phase of viral hepatitis, patients may experience respiratory and gastrointestinal tract symptoms, which may include malaise, fatigue, myalgia, nausea, and/or vomiting. They may also experience moderate weight loss, headache, fever, or pharyngitis and cough. Many patients complain of mid epigastric pain, right upper quadrant discomfort, or diarrhea (Wilkins et al., 2010).

Also characteristic of this phase is the development of dark urine and the lightening of stool color. The prehepatic phase may range from 2-3 days to 2-3 weeks. The icteric phase is signaled by the development of jaundice (Wilkins et al., 2010). Overview Since patients do not have symptoms from hepatitis C; many of them are diagnosed only after they are found to have abnormal liver enzymes (e.g. ALT, AST and Alkaline Phosphates). At times, these liver enzymes are part of routine blood work (Hajarizadeh et al., 2012).

Other patients may be tested because of specific risk factors, such as a remote history of blood transfusions or exposure to needles. Hepatitis C antibody is detected in almost all persons with hepatitis C (Yee t al., 2001). Since, the antibody takes weeks to months to develop; it can be falsely negative, especially earlier after exposure. If the hepatitis C antibody is positive, the actual presence of virus should be confirmed with a PCR- based test. "Qualitative" PCR tests are super-sensitive and detect minute amounts of hepatitis C with the blood and known as "viral load". Since some persons (perhaps 15%) clear hepatitis C without treatment, they may have a positive hepatitis C antibody but negative PCR tests. The role of liver biopsy in the diagnosis and management of hepatitis C is somewhat controversial (Hajarizadeh et al., 2012).

Biopsy is an outpatient procedure where a needle is used to obtain a small amount of liver tissue for examination by a pathologist under a microscope. Serious risks of a liver biopsy include bleeding, infection, perforation of a visceral organ (e.g. bowel), puncture of the lung, and others. Liver biopsy remains the "gold standard" test in liver medicine; it allows a clinician and pathology to "grade" and "stage" liver disease (i.e. determine the amount of on-going disease activity and resultant fibrosis, respectively). Some clinicians recommend liver biopsy routinely to all patients with hepatitis C while others do so only selectively (Kleiner, 2005).

Cirrhosis of the liver is a pathogenic condition that results from the exposure of healthy liver tissues to inflammation that affects the performance of its function normally (Khulla and Firpi, 2015).

The main goal of treating patients with chronic hepatitis C virus infection is to prevent progressive hepatic fibrosis by eradicating viral RNA. Therefore, genotype and baseline hepatitis C virus RNA levels seem to be the most important predictors of response.

Recently, the cornerstone of therapy involves a combination of pegylated interferon alfa and ribavirin. The former is generally given subcutaneously once a week, while the latter is given orally on a daily basis. Combination pegylated interferon alfa and ribavirin therapy can achieve a sustained virological response in 54%-56% of patients, including 42%-46% of patients with genotype 1 infection and about 80% of those with genotype 2 or 3 infection (Patel et al., 2006; Kish et al., 2017).

This "early virologic response" (EVR) can be very helpful. Conventionally, for an EVR estimation, a viral load is checked after 12 weeks of therapy and compared with the pre-treatment level. More recently, some physicians have been using an even earlier viral load check (e.g. at 4 weeks) in order to identify a subset of patients who are "super responders" Such patients may be candidates for shorter duration of therapy (e.g. 6 months for genotype 1). With treatment, even in otherwise very healthy patients, requires close monitoring to ensure safety (Kish et al., 2017).

The main objective of the study is an understanding of the natural history of hepatitis C is essential to effectively manage, treat, and counsel individuals with HCV infection in western Libya.

METHOD

Sample Collection:

A total of 64 anti-HCV positive serum samples from individuals of physical examination were recruited from the Tripoli central Hospital infectious department Tripoli from January 2023 to June 2023. 64 samples with a positive PCR for HCV RNA. The age of anti-HCV positive individuals of physical examination ranged from 20 to 90 years old.

Collect whole Blood/Serum/ Plasma specimens following regular clinical laboratory procedures. Data collection sheet was prepared which included the details of patients, such as name, age, sex, address of the patients, relevant history, examination details, diagnosis and laboratory investigations were collected and recorded.

Ethical clearance:

The study was ethically cleared and approved by the ethical review committee of the Tripoli central hospital with a supporting letter from the Medical Technology Research Team at the University of Tripoli/ Faculty of Medical Technology. Data were collected after getting approval from the hospital medical director and written informed consent from each study participant. Data confidentiality was kept through avoiding personal identifiers and anonymity of personal data records.

Statistical Analysis:

Data were entered and analyzed by and prism ⁵ software. Variables are expressed as mean standard deviation, while frequency and percentage of the remaining variables were used unless otherwise stated.

RESULTS

Distribution of cases according to sex:

In this study was found that 65.62%, of male patients with positive HCV and 34.37% female patients.

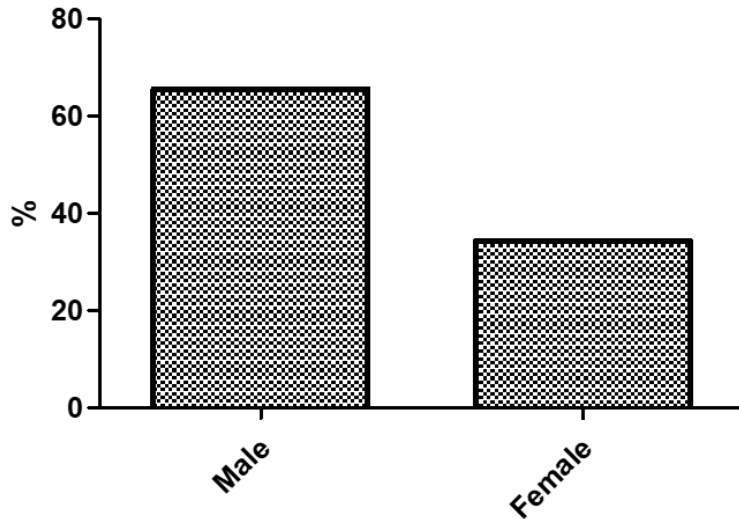


Fig. 1. Distribution of cases according to sex

Distribution of cases according to Age:

Through the results, we divided the age of the cases into seven age groups, where the number of cases in the age group of (20-29) years was 8 cases with a rate of 12.5% and the age group (30-39) years was 5 cases at a rate of 7.81% while the age group (40-49) years had 16 cases with a rate of 25%, and the age group (50-59) years was 23 cases with a rate of 35.93%, and the age group (60-69) years was 9 cases with a rate of 14.06%, and the age group (70-79) years was 2 cases with a rate of 3.12%, and the age group (80-89) years was 1 cases with a rate of 1.56%.

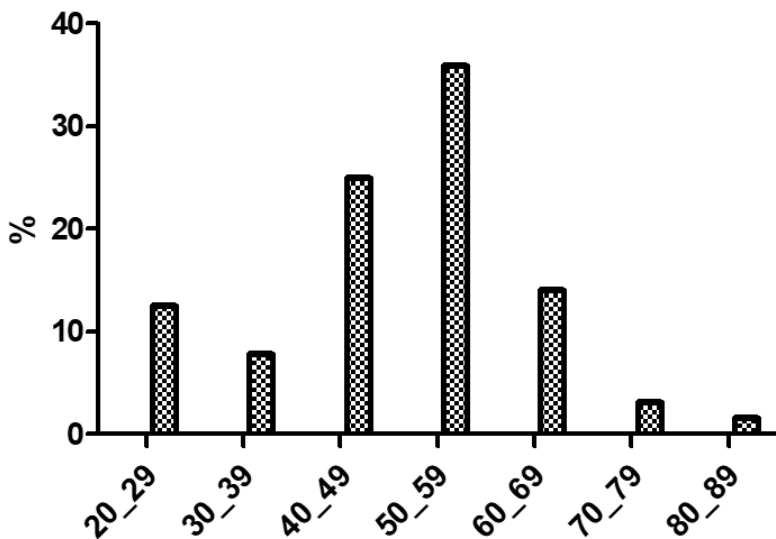


Fig. 2. Distribution of cases according to age

Distribution of cases according to WBC:

For male, we found that most of the cases had an decrease in the rate of WBC 5 cases by 11.9%, and 32 cases had normal rate of WBC by 76.9%, and 5 cases had increase rate of WBC by 11.9%.

For female, no cases of a decrease of WBC, and we found that most of the cases had normal rate of WBC 19 cases by 86.3%, and 3 cases had increase rate of WBC by 13.6%.

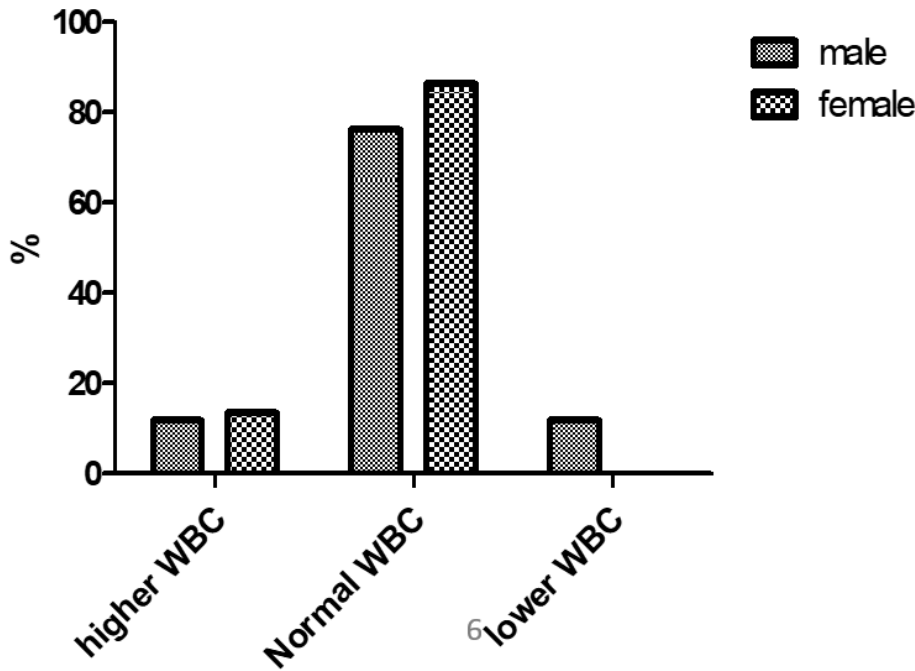


Fig.3. Distribution of cases according to WBC

Distribution of cases according to platelet counts:

For male, we found that most of the cases had an decrease in the rate of *platelet counts* 9 cases by 21.4%, 32 cases had normal rate of *platelet counts* by 76%, and 1 case had increase rate of *platelet counts* by 2.38%.

For female, we found that most of the cases had an decrease in the rate *platelet counts* 3 cases by 13.6%, and 19 cases had normal rate of *platelet counts* by 86%, and no cases of an increase *platelet counts* was recorded.

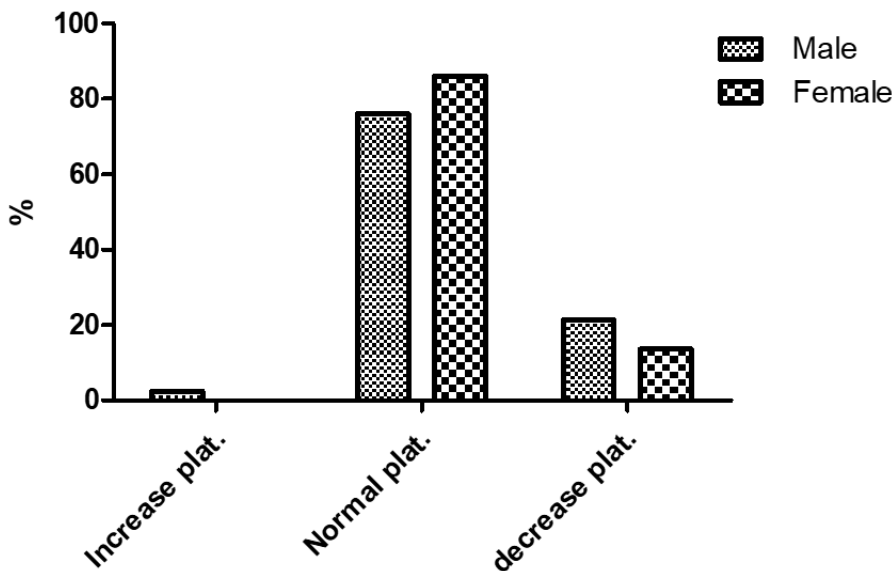


Fig. 4. Distribution of cases according to platelet counts

Distribution of cases according to ALT:

For male, we found that most of the cases had an increase in the rate of ALT 8 cases by 19%, and 34 cases had normal rate of ALT by 80%, and 0 cases had decrease rate of ALT.

For female, we found that most of the cases had an increase in the rate of ALT 6 cases by 27%, and 16 cases had normal rate of ALT by 72%, and no cases of a decrease rate of ALT.

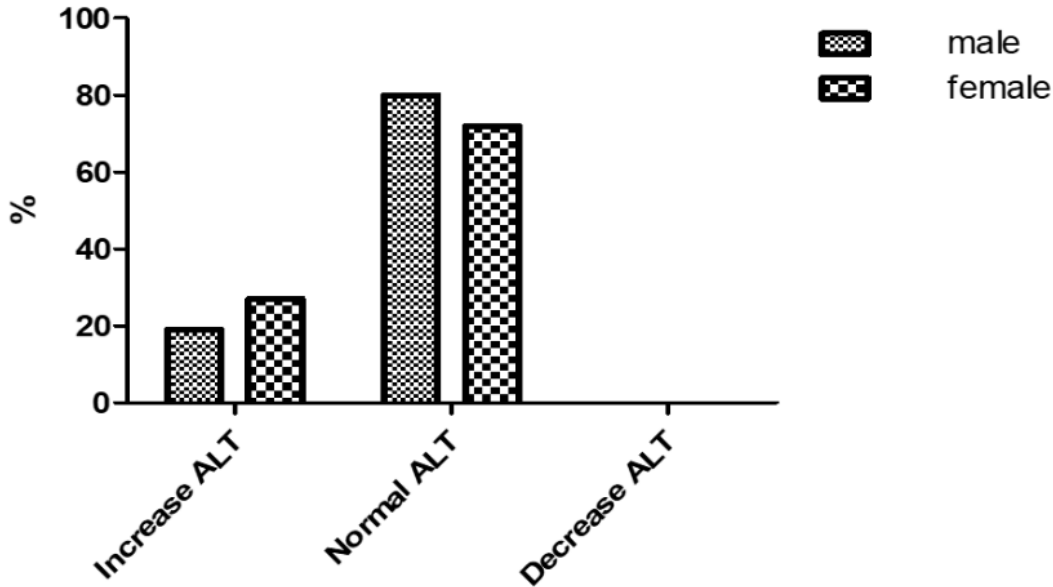


Fig. 5. Distribution of cases according to ALT

Distribution of cases according to AST:

For male, we found that most of the cases had an increase in the rate of AST 8 cases by 19%, and 34 cases had normal rate of AST by 80%, and 0 cases had decrease rates of AST.

For female, we found that most of the cases had an increase in the rate of AST 6 cases by 27%, and 16 cases had normal rate of AST by 72%, and no cases of a decrease AST.

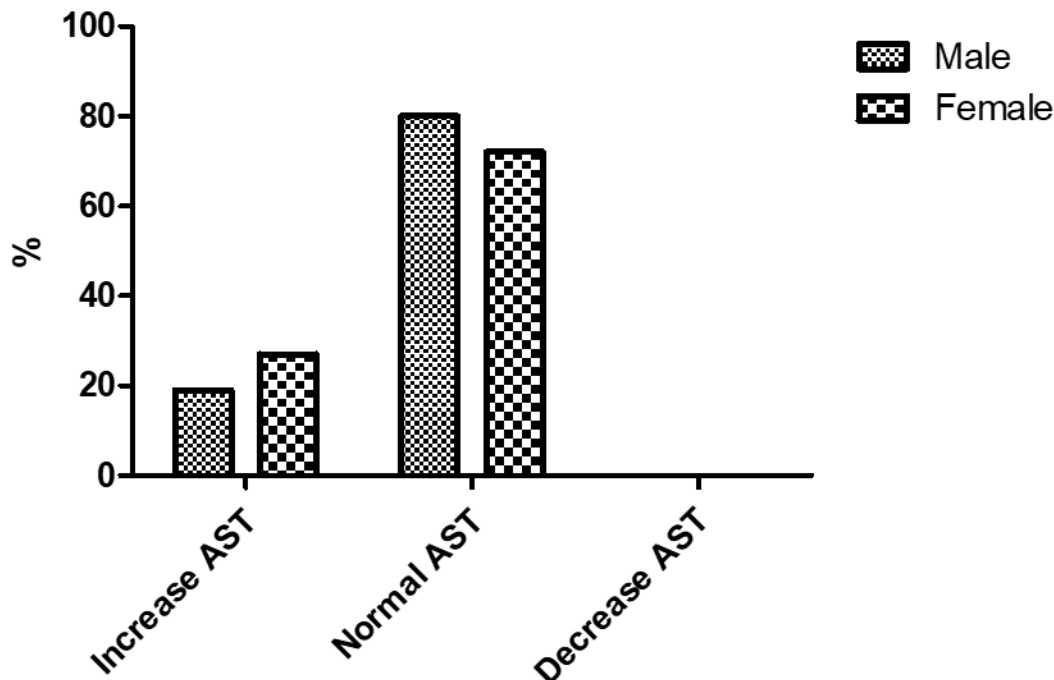


Fig. 6. Distribution of cases according to AST

Distribution of cases according to T.BIL:

For male, we found that most of the cases had an increase in the rate of T.BIL 4 cases by 9%, and 38 cases had normal rate of T.BIL by 90%, and 0 cases had decrease rate of T.BIL.

For female, we found that most of the cases had an increase in the rate of T.BIL 3 cases by 13%, and 19 cases had normal rate of T.BIL by 86%, and 0 cases had decrease rate of T.BIL.

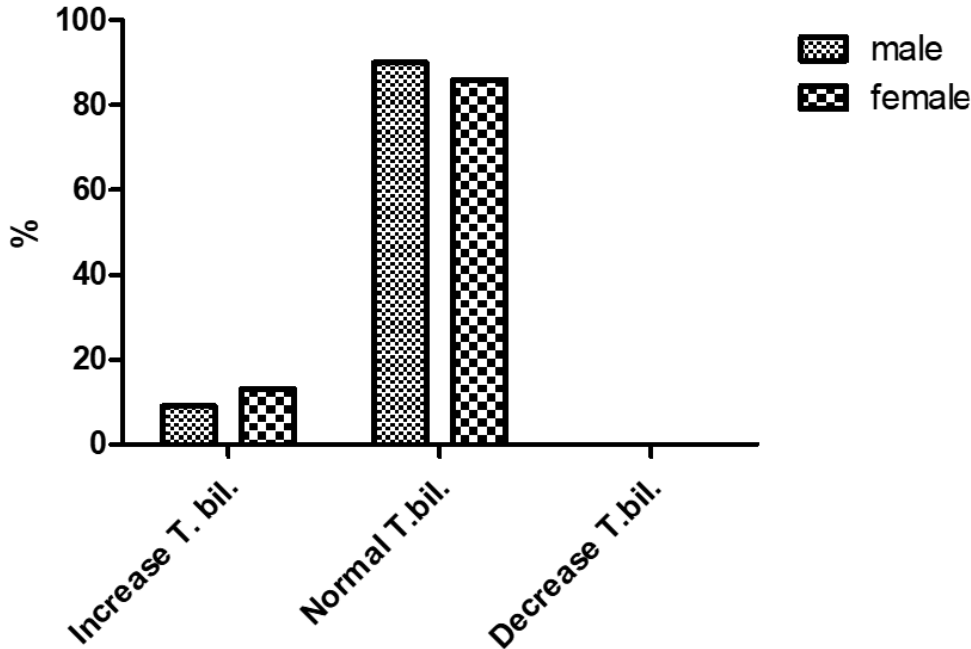


Fig. 7. Distribution of cases according to T.bil

Distribution of infected cases according to Liver cirrhosis:

6.25% of male patients were found with liver cirrhosis, compared to 9% of female patients. Whereas, 95%, 90% respectively no liver cirrhosis.

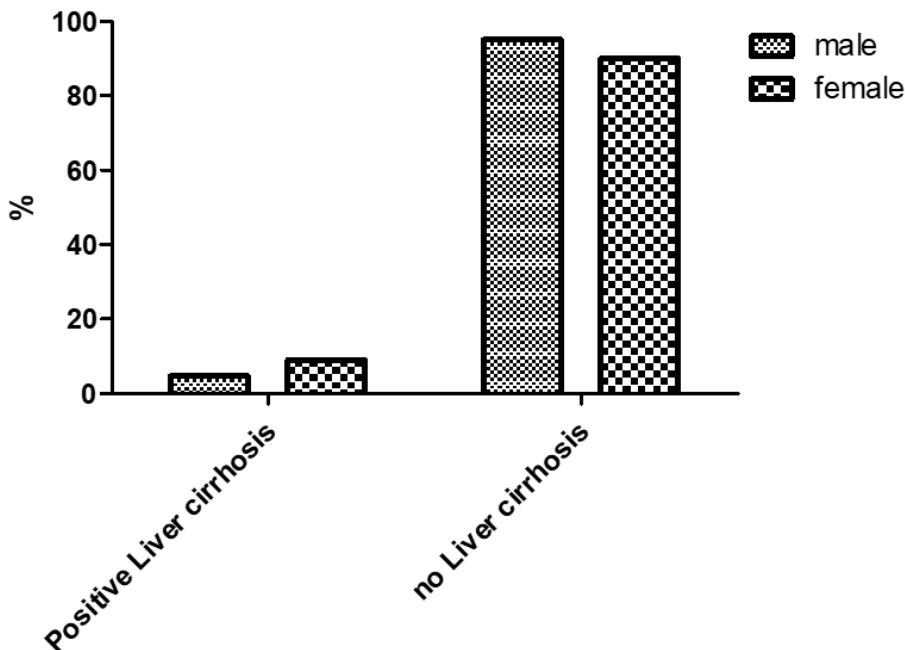


Fig. 8. Distribution of cases according to liver cirrhosis:

DISCUSSION

In Libya, the prevalence of HCV infection in the general population according to the latest national screening survey that was carried out in 2008 was 1.2% (Daw and El-Bouzedi, 2014). This study population consisted of 64 patients (65.6% anti-HCV antibody-positive male and 34.3 % anti-HCV antibody-positive female). These reports have showed that HCV is more in male patients than female patients. Previous studies have showed similar findings (Rao et al., 2012). However, other study found that the female patients before ages 60 more than male (Niu, 2016). Racial differences should be considered an increased risk for men to be infected by HCV may be due to unhealthy lifestyles or behaviors, such as unhealthy sexual activities, drug abuse, smoking and drinking (Chen et al., 2018).

The rate of reported cases of acute hepatitis C remained the highest among persons aged 50–59 years (35.93%) and 40–49 years (25%). on the other hand, the prevalence appear to decline rapidly after 60 years old, This is in agreement with previous studies carried out in Libya, which reported a peak in the prevalence of HCV among those 46-55 years old (Daw et al., 2002). One possible reason for this would be the decrease in physical mobility and economic development (Niu et al., 2016). A recent studies have indicated that there was no change in level of white blood count (WBC) in male and female positive HCV patients where as in previous studies have found HCV-infected persons in the general population of the United States are more likely to have low neutrophil and platelet counts (Streiff et al., 2002).

Considering the level of alanine aminotransferase (ALT) and aspartate transaminase (AST) values were measured. Serum ALT and AST levels, as a measure of biochemical hepatitis activity 1g (Sievert, 2002). We found that, in our sample of Libyan patients, serum ALT and AST levels were normal is not correlated with, viral infection and liver cirrhosis of HCV infection. Identifying HCV is often difficult because HCV carriers with persistently normal ALT levels are usually asymptomatic or have nonspecific symptoms (Umumararungu et al., 2017).

However, that some authors have reported higher ALT levels in patients with high viral infection (Hassan et al., 2002) and Serum ALT and AST elevation ten time more (Hajarizadeh et al., 2012). Although raised S. ALT and S. AST levels indicate liver disease, in 25-30% of patients of chronic hepatitis C, the serum ALT and S.AST levels return back to normal after 12 weeks of infection despite progression of disease (Giannini et al., 2003). Previous studies have showed that most of the patients with normal or near normal ALT levels lead to slow progression of the disease and milder liver lesions on histology (Giannini et al., 2003; Khokhar, 2003). Whereas, in some studies serum ALT and S. AST levels were not the reliable indicator of histological severity of the disease (Fabris et al., 2006).

In our research, we found that the total serum bilirubin were normal level in HCV patients. Ijaz and his colleagues 2011 have reported that the strong negative correlation with bilirubin and HCV. Hepatitis C virus infection is the leading cause of chronic liver disease, cirrhosis, hepatocellular carcinoma (HCC) and recently the primary indication for liver transplantation in the United States (Davis et al., 2003).

Although no significant difference in the severity of cirrhosis was noted, HCV-only 4.7-9% of patients had liver cirrhosis; 90-95% of patients with HCV had normal liver. Chronic HCV progresses slowly, but can accelerate over time, especially as patient's age or in the presence of co-factors such as human immunodeficiency virus (HIV) or hepatitis B virus (HBV) coinfection, or continuous alcohol intake. Cirrhosis develops in 4%-24% of patients within 20 years after chronic infection (Hajarizadeh et al., 2013).

However, patient race/ethnicity and HCV genotypes affected the risk of future liver events and death. The role of HCV genotypes with lethal sequence of liver disease is one of the most controversial topics of HCV research (Zein, 2000). However, people infected with genotype 1, particularly subtype 1b, and may have a greater chance of developing **cirrhosis** (Zein, 2000). African Americans are at greater risk for the complications of chronic hepatitis C; including End stage liver disease (ESLD), Hepatocellular carcinoma

(HCC), and death. African Americans are also less likely to respond to current HCV therapies than are whites (Howell et al., 2000; El-Serag and Mason, 1999).

Recently extensive investigation was performed on HCV genotypes in Libya. Hepatitis C virus genotype 4 was the predominant one, followed by HCV genotype 1 and then other less common genotypes (Elasifer et al., 2010). In the treatment of HCV, the drugs are used as therapy includes interferon-alpha alone or with combination with Ribavirin and provides excellent viral suppression with a low risk of antiviral resistance. Prolonged treatment with oral antiviral medication is usually required and relapse is common if treatment is discontinued.

The present study had several potentially important limitations; the sample size was small with few patients refused follow up and more data are needed to determine the risk factors related to transmission of HCV.

CONCLUSION

We conclude that men are more infected with hepatitis C. The most age group infected with hepatitis C is (50-65), and this is not a good indicator and should be alerted. A biochemical profile with poor values of liver markers, especially ALA, AST, and total bilirubin, and the risk of liver cirrhosis is low and after use of the PCR test all patient presences of hepatitis C virus RNA.

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