WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF MEDICAL LABORATORY SCIENCE

Magnitude of Hepatitis B and C virus infection among patients attending Halaba Kulito primary hospital, South Ethiopia.

BY:

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A research submitted to the department of Medical Laboratory sciences, College of Medicine and Health Sciences, Wolkite University; in partial fulfillment of the requirements for the degree of Bachelor of Science in Medical Laboratory Sciences.

WOLKITE, ETHIOPIA

JANUARY 2020

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Abbreviations

Anti HCV Ab = Anti Hepatitis C virus anti body

CLD = Chronic liver disease

ELISA= Enzyme linked immunosorbent assay

HBcAg = Hepatitis B core antigen

HBV= Hepatitis B Virus

HBs Ag = Hepatitis B surface antigen

HCC = Hepatocellular Carcinoma

HCV= Hepatitis C Virus

IDU = Injection Drug Users

WHO = World Health Organization

SOPS = Standard Operating Procedures

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Abstract

Background: Hepatitis B and C virus infection are among causes of morbidity and mortality worldwide. They are major causes of chronic liver disease which can lead to cirrhosis and liver cancer. Globally, HBV and HCV infection accounts 620,000 and 350,000 people's death per year respectively. Ethiopia is one of the high burden countries with regard to prevalence of HBsAg and anti-HCV.

Objective: The aim of the study was to assess the magnitude of HBV and HCV infection among patients attending Halaba Kulito Primary Hospital, Halaba zone, South Ethiopia from Sep 2019 to April 2020.

Method: A facility based retrospective cross sectional study was conducted from Feb 1 to Feb 30/2020. Data extraction sheet was used for the collection of socio-demographic and HBV and HCV infection status data. SPSS version 20 statistical software packages was applied for analysis. Descriptive statistics like frequencies and proportions was used to summarize the data. Qi square test analyses was applied to examine the relationship between the dependent variables and associated factors. A P-value < 0.05 was considered to declare a significant association.

Result: Of 750 participants examined for hepatitis B, and hepatitis C viruses'sero-status, the majority were females (82.1%). Among the enrolled participants 24.5 %(184) were infected with at least one of the two pathogens. About 14.7% (110) of the participants were found to be sero-positive for HBsAg. Anti-HCV antibody positivity rate was 9.9 %(74). Both hepatitis B and C virus infection was highly prevalent in patients came from Weyira Zuriya woreda and followed by Atoti Uullo woreda.

Conclusion and Recommendation: The prevalence of Hepatitis B and C virus was considerably higher among participants at Halaba primary hospital. The finding suggests the need for strengthening prevention and control strategies of hepatitis infections.

Keywords: Hepatitis virus, Chronic Liver disease, Halaba, Ethiopia

Chapter one: Introduction

1.1Background

Hepatitis is an inflammation of the liver commonly caused by viral infection of these viruses; Hepatitis B virus (HBV) and Hepatitis C virus (HCV) which accounts substantial proportion. Chronic hepatitis B and C virus infections are major public health problems. Approximately 350–400 million people worldwide are chronic hepatitis B surface antigen (HBsAg) carriers, and HBV is a leading cause of cirrhosis and associated liver failure, hepatocellular carcinoma (HCC) and death. Indeed, one half to one million deaths are estimated to be related to HBV every year (1).

Chronic hepatitis C is one of the main causes of HCC and common indication for liver transplantation in many European countries. In recent therapeutic advancements and progresses were made in Europe to manage and treat the case in individual level. Attention should be given to the dynamics of infection, natural history, screening, and therapeutic access which influence the impact of antiviral therapy on morbidity and mortality not known. (4, 5).

The epidemics of HBV and HCV are continuously evolving, mainly because of decreased safety of blood donations, low improvement in health care conditions, continuous expansion of intravenous drug use, and immigration to Europe from endemic areas.(6). Improvements that made has not translated into a reduced HBV burden, since the absolute number of HBsAg-positive persons continues to increase (6,7).

However, although chronic hepatitis C is a curable disease, treatment uptake rates have remained low. The reasons are manifold and include financial issues, fear of possible side effects of interferon-based therapies and low detection rates. (4, 8).

Combined HBV and HCV infection is possible because they have common mode of transmissions (6). HBV can be transmitted through exposure to infectious blood, semen and other body fluids, from infected mother to infants during birth, contaminated injection during medical procedure and injection drug use (7). HCV is transmitted mainly through blood and blood products, transfusion, injection medical process and medical use and sexually (7). Risk factors that facilitate the transmission of HBV and HCV are tooth extraction, blood and blood product transfusion, close contact with jaundiced patients, injection during use over crowded

environment. Risk groups for HBV and HCV infections are injection drug users, prisoners, individuals with multiple sex partners and with multiple blood transfusion, individual who experience tooth extraction, health care workers and infants whose mother is chromic HBV and /or HCV carrier (8)

The main pathogenesis mechanism that causes the infection is the host's cell mediated immunity and inflammation (10). Sign and symptoms of acute HBV and HCV infection include fever, malaise, anorexia, nausea, vomiting, abdominal pain, chills, possible enteric symptoms of liver damage (e.g. jaundice, dark urine and pale stool). chronic HBV and HCV infections occur after mild or apparent initial disease and can be detected by elevated liver enzyme level , but as many as 10% of patients with chronic hepatitis may developed cirrhosis and liver failure or cancer (9).

HBV and HCV infections are diagnosed mainly by serologic technique (ELISA or rapid test kits). The diagnosis of HBV involves detection of viral antigens (HBsAg, HBeAg and HBcAg and serum pattern of antibody to individual antigens .When neither HBsAg nor anti-HBsAgAb can be detected (window) diagnosis is depends on measure of IgM anti HBcAg (9). HCV is diagnosed by detection of anti HCV Ab in the serum but in early infections the Ab may not be detected so, confirmatory test by PCR to detect the HCV RNA. The only known treatment for HCV is interferon alpha with or without ribavirin. HBV has no specific treatment; interferon alpha may effective to treat HBV chronic infection (10, 11).

1.2 Statement of the problem

Infection with HBV and HCV are still a major public health problem worldwide, particularly in developing countries (10). HBV and HCV infections can cause both acute and chronic liver disease, including cirrhosis and hepatocellular carcinoma (HCC). Studies showed that 80% of HCC was caused by active replication of chronic HBV and HCV infections (11, 12). For instance, about 686, 000 people die every year due to complications of HBV infection (Cirrhosis and HCC) (13).

According to the World Health Organization (WHO) report, globally, about 400 million and 170 million people are chronically infected with HBV and HCV, respectively (17). Approximately 1 million people die each year from hepatitis B and C virus infections (18).

Therefore, the prevalence of HBV and HCV infections at the community level is not exactly known. HCV infects an estimated 130–170 million persons worldwide and is responsible for 350,000–500,000 deaths per year (2,3). In Europe, where an estimated 7.3–8.8 million people are infected with HCV, the overall prevalence of the infection is 1.1–1.3%, ranging from 0.6% in Germany to 4% in Italy (4, 5).

Although remarkable advancements are developed, these viral infections become a serious health challenge of world including Africa. In Africa, one fifth of the populations are chronic hepatitis B and C Viruses Carriers and liver cancer is the major cause of death in the continent (29).

In sub-Saharan Africa the prevalence of HBV carriers ranges from 10 to 20%(13). Ethiopia is one of the highest burden countries with high prevalence of HBsAg(35.8%)and anti-HCV(22.5%) among chronic liver diseases and is country without organized handling and controlling measures and the community have no good awareness regarding the infection. This is causing more burden of chronic liver disease (CLD) In Ethiopia due to viral hepatitis (14).

In Ethiopia, there is lack of information on the prevalence of HBV and HCV in the general population. This is due to the fact that virtually all prevalence data on HBV and HCV have been obtained in selected group of people with risk factors such as pregnant women, military personnel and patients with liver disease (19, 21). For instance, the prevalence of HBV and HCV in pregnant women was between 4.4 and 0.26%, respectively (22).

1.3 Significance of the Study

To the best of our knowledge, studies related to the magnitude of HBV and HCV infection among patients attending Halaba Kulito Primary Hospital, Halaba South Ethiopia is lacking. Therefore, the findings from this study will help the health planner, regional state, zone and town of Kulito to plan training of more health workers to improve their capacity in case finding and case holding. In addition, the findings from the study will enable health workers who are involved in health institution to embark health education using evidence-based information which enhance early screening, detection and treatment of hepatitis virus. Moreover, it will provide a clue for other researchers to give more attention and to serve as baseline data for further research.

Chapter 2: Literature Review

2.1 Magnitude of HBV and HCV infection

A cross-sectional retrospective study was conducted in Vietnam in 2014 showed that among 724 HIV positive patients treated at the HIV outpatient clinic in National Hospital of Tropical Disease (NHTD) during the study period. Of these, 364 (50.3%) were determined to be co-infected. Of these, 61/724 were sero-positive for only HBV (8.4%), 256/724 were sero-positive for only HCV (35.4%), and 47 were sero-positive for both HCV and HBV (6.5%) (26).

A retrospective cohort study at the Sihanouk- Hospital-Center-of-Hope (SHCH) in Phnom Penh, Cambodia indicated that among 3089 adults 341 (11.0%) were co-infected with HBV and 163 (5.3%) with HCV. Over a median art follow up time of 4.3 years, 240 individuals died. Mortality was 1.6 higher for HBV co-infection in adjusted analysis. After the first year of
ART, the independent mortality risk was 3-fold increase in HCV co-infection. A total of 180 (5.8%) individuals discontinued efavirenz or nevirapine due to severe liver toxicity, with an independently increased risk for HBV and HCV. CD4 recovery was lower in both HBV and HCV co-infection but only statistically significant for HBV (27).

In Rwanda, HBV prevalence data is only available among specific population subgroups. One study among 13,121 pregnant women in 30 sentinel sites found a prevalence of HBsAg of 3.7% (8). A recent study of 117,258 people living with HIV (PLHIV) found a prevalence of HBsAg of 4.3% [10]. However, there are limited data on the epidemiology of HBV in the general population. In order to understand the serological prevalence of HBV in the general population of the country, the Rwanda Biomedical Center (RBC) and its partners conducted several HBV screening campaigns to inform HBV prevention and treatment programming in Rwanda. This article analyzed the prevalence and risk factors of HBsAg sero-positivity among people who participated in a national hepatitis screening campaign in Rwanda (26).

A descriptive cross-sectional study was conducted in Guinea-Bissau showed that among 576 patients; twenty-four patients (4.2%) were reactive for anti-HCV in the chemilluminescence test. Anti-HCV-positive and HCV RNA-negative samples had a confirmatory anti-HCV test performed in which 2/16 (12.5%) were reactive; the adjusted anti-HCV prevalence was 10/576 (1.7%) and the specificity of the chemilluminescence test was 97.5%. HCV RNA was detected in 8/24 samples (33.3%); HCV RNA prevalence was 1.4%. HCV RNA ranged between 65 _ 103 and 78 _103 IU/ml and all were genotype. Only one patient was co-infected with hepatitis B virus (HBsAg-positive) and HCV (21).

A cross sectional study was carried out in Nigerian tertiary hospital among 102 HIV infected patients the dual presence of HBsAg and anti-HCV in 4(3.9%)study patients while 29 (28.4%) tested positive for HBsAg and 15 (14.7%) for anti HCV. The control subjects have a much lower prevalence of 22(6.0%) and 3(0.8%) for HBsAg and anti-HCV respectively while dual presence of HBsAg and ant-HCV was 0% prevalence (21, 22).

The difference in prevalence of hepatitis between the control and subjects is statistically significant. There are more female patients in the younger age group with a peak at 30-34years while the males are older with a peak in the 55- 59 years age group. The age range of the patients is 20-79 with a mean of 38years. More male patients 16(50%) have hepatitis co infection than the female32 (45.7%). The difference is however not statistically significant. HIV/HBV co infected patients were more likely to be male12 (75%) while HIV/HCV co infected patients were more likely to be female12 (37.5%). Triple infection with HIV/HBV/HCV was higher among the female 3 (9.4%) than the male patients 1 (6.3%).The difference is not statistically significant (24).

A cross sectional study was carried out In Nairobi, Kenya indicated that from the a total of 300 hundred infected individuals consisting of 129 (43%) males and 171 (57%) females 15.3% (46/300) were HIV-1 co-infected with either HBV or HCV or both, 10.3% (31/300) with HIV-1 and HCV and 6% (18/300) with HIV-1 and HBV infections. However, only three individuals (1%) were co-infected with the three viruses (HIV/HBV/HCV) (25).

A cross-sectional study was conducted in Gojjam zones, northwest Ethiopia indicated that among 481 adults 7.5% of adult population were infected either with HBV, HCV and HIV. The prevalence of HBV was 15(3.1%) and for HIV was 16(3.3%). The sero-prevalence of HCV was five (1.0%). HIV-HCV co-infection was found to be two (0.4%). HIV prevalence was higher in non-educated population than their counter parts (28).

2.1. Associated factors of HBV&HCV infection

Based on different international, continental and national research works, there are many associated factors which are related directly or indirectly to hepatitis virus infections. Generally these factors are believed that they may make an individual with these factors more susceptible than individuals without these factors. Those associated factors are: HIV, pregnancy, Diabetes mellitus, multiple sexual relationship, alcohol intake, inejection drug users and others (29).

Chapter 3: Objectives

3.1 General objective

- To assess the magnitude of HBV and HCV infection among patients attending Halaba Kulito Primary hospital, Halaba zone, South Ethiopia, from February 2019 to January 2020 GC.

3.2. Specific objective

- To determine magnitude of HBV infection
- To determine magnitude of HCV infection
- To compare the distribution of hepatitis cases in different woreda

Chapter Four: Methods and Materials

4.1. Study Area and Period

The study was conducted at Halaba Kulito Primary Hospital from February 1 to February 30/2020. The hospital located in Halaba zone, Southern part of Ethiopia. Based on the recent census conducted by the Central Statistical Agency of Ethiopia, Halaba zone has a total of an estimated population of 39560, out of these 19675 male and 19885 female, it is located 520 Km South from the capital City Addis Ababa. Its astronomical location latitude and longitude is $7^0$18´44´´ N and $38^0$05´21´´ E respectively with an elevation of 1726 meters above sea level. Halaba Kulito Hospital is a Primary level Hospital that provides health service for over 100 thousand inhabitants including nearby zones. It has more than 100 staff members including Laboratory professional, Nurses/Midwifes and physicians.

4.2 Study design

A facility based retrospective cross sectional study was conducted.

4.3. Population

4.3.1. Source population

The source population was all patients attended to Halaba Kulito Primary hospital.

4.3.2. Study population

All patients who fulfill the inclusion criteria and tested for HBV and HVC during the study period.

4.4. Eligibility Criteria

4.4.1 Inclusion Criteria

Patients who were admitted at Halaba Kulito primary hospital during the study period and had complete data were included into the study.

4.4.2 Exclusion criteria

Patients who attended Halaba Kulito primary hospital with incomplete data were excluded from the study.

4.5 Study Variables

4.5.1. Dependent Variable

- HBsAg sero-status
- HCV Ab sero-status

4.5.2. Independent Variables

- Age
- Sex
- Month of test
- Residence(Woreda)

4.6 Data Collection and laboratory Process

An 8-month Hepatitis B and C data were extracted from laboratory log book by data collection sheet including month, sex, age, residence and Hepatitis B and C sero-status. In Halaba Kulito primary hospital, one step HBsAg test strip (Nantong Diagnos Technology Co., Ltd., China) was used for the screening hepatitis B surface antigen (HBsAg). Whereas one step HCV test strip (Nantong Diagnos Technology Co., Ltd., China) was used to detect antibodies against HCV following the instructions of the manufacturer. From clinically suspected patients, 4-5 ml of blood was collected and centrifuged in the test tube 2000-3000 rpm for 4-5 minute to separate plasma (serum). Then, remove the test kit (strip) which contains coated antibody to test HBsAg and coated antigen to test HCV antibodies from its pack on the table. Add 2-3 drops of serum (plasma) into the sample well (kit) and wait for about 10-15 min. Finally, the result read; positive if colored line on both test and control, which indicates the presence of the hepatitis and negative if colored line on the control only but not test line.

4.7 Data quality assurance

The hospital laboratory run control samples during utilization of new batch of test kit for monitoring the performances of kits and test procedures and interpretation of test results was performed according to the precautions and instructions supplied by the manufacturer.

4.8 Data analysis

The collected data was entered into excel and exported to SPSS version 20.0 (SPSS, Chicago, IL, USA) for analysis. Descriptive statistics like frequencies and proportions was used to summarize the data. Qi square test analyses was used to examine the relationship between the dependent variables and independent factors. P value < 0.05 was utilized to declare significant association.

4.9 Ethical consideration

Ethical clearance was obtained from Department of Medical Laboratory Science, college of Medicine and Health Sciences, Wolkite University. Permission to conduct the study was also obtained from Halaba Kulito primary hospital. Confidentiality of the study participants was strictly maintained.

4.10 Dissemination plan

The findings will be presented to department of Medical Laboratory Science, College of Medicine and Health Science. After the approval, the study result and findings will also be submitted to relevant bodies, Kulito town health office, Halaba Zone Health office, SNNP Regions Health Bureau, and Federal Ministry of Health. Finally, attempts will be made to publish the results of the study on local or international journals

Chapter Five – Result

5.1 Characteristics of study population

As shown in table 1, a total of 750 participants were screened for both HBsAg and HCV antibodies at Halaba Hospital, south Ethiopia during the study period. Of these, 17.9% (134) were males and 82.1% (616) were females. The median age of participants was 25 years (IQR 22.0-30.0) and majority fall in the age group 21–29 years (50.8 %). Most of the participants were from Ketema Astadadar 32.7 %(245) and the least number was from Dijjo Weyira woreda 10.1 %(76).

Table1. Socio-demographic characteristics of test participants at Halaba hospital, south Ethiopia from January 2019 to December 2020 (n = 750).

Variables	**Frequency**	**Percentage**
Sex		
Male	134	17.9
Female	615	82.1
Age group (years)		
≤ 20	146	19.5
21-29	381	50.8
30-41	202	26.9
≥ 42	21	2.8
Residence(Wereda)		
Ketema Astadadar	245	32.7
Weyira Zuriya	240	32

Atoti Uullo	189	25.2
Dijjo Weyira	76	10.1
Month tested /2012		
1/2012	121	16.1
2/2012	142	18.9
3/2012	94	12.5
4/2012	84	11.2
5/2012	69	9.2
6/2012	100	13.3
7/2012	91	12.1
8/2012	49	6.5

5.2 Magnitude of Hepatitis B and C infection

The overall prevalence of hepatic infections among tested participants at Halaba hospital was 24.53 %(184). The sero-prevalence rate of HBV and HCV was 14.7% and 9.9% respectively.

High prevalence of HBV was found in the age group of ≤ 20 (19.9%) and male 20.1 %(27). High proportion of HCV was found in the age group of 30-41 (12.4%). High percentage of HCV was found in male 10.4 %(14)(table 2).

Sex had significant association with hepatitis B infection (p=0.048). However, proportion of HBV infection had not significant difference with regard to age and residence (table 2).

Majority 59 %(109) of hepatic infection was HBsAg, followed by HCV 39 %(72) and the least was mixed infection (2%).There was 0.4 %(3) mixed infection prevalence (Figure 1).

Table 2 Association of HBsAg with selected socio-demographic variables among the study participants at Halaba Hospital from January 2019 to December 2020 (n=750).

Variables	**No. tested (%)**	**HBsAg**		**Anti HCV**	
		No. positive (%)	**P-value**	**No. positive (%)**	**p-value**
Sex					
Male	134(24.5)	27(20.1)	0.048*	14(10.4)	0.803
Female	616(75.5)	83(13.5)		60(9.7)	
Age group(years)					
≤ 20	146(19.5)	29(19.9)	0.145	12(8.2)	0.242
21-29	381(50.8)	54(14.2)		37(9.7)	
30-41	202(26.9)	26(12.9)		25(12.4)	
≥ 42	21(2.8)	1(4.8)		0(0)	
Residence					
Ketema astadadar	245(32.7)	28(11.4)	0.351	21(8.6)	0.351

Weyira zuriya	240(32)	40(16.7)		23(9.6)	
Atoti uullo	189(25.2)	31(16.4)		22(11.6)	
Dijjo weyira	76(10.1)	11(14.5)		8(10.5)	

*Indicate significant association, p-value= chi-square result

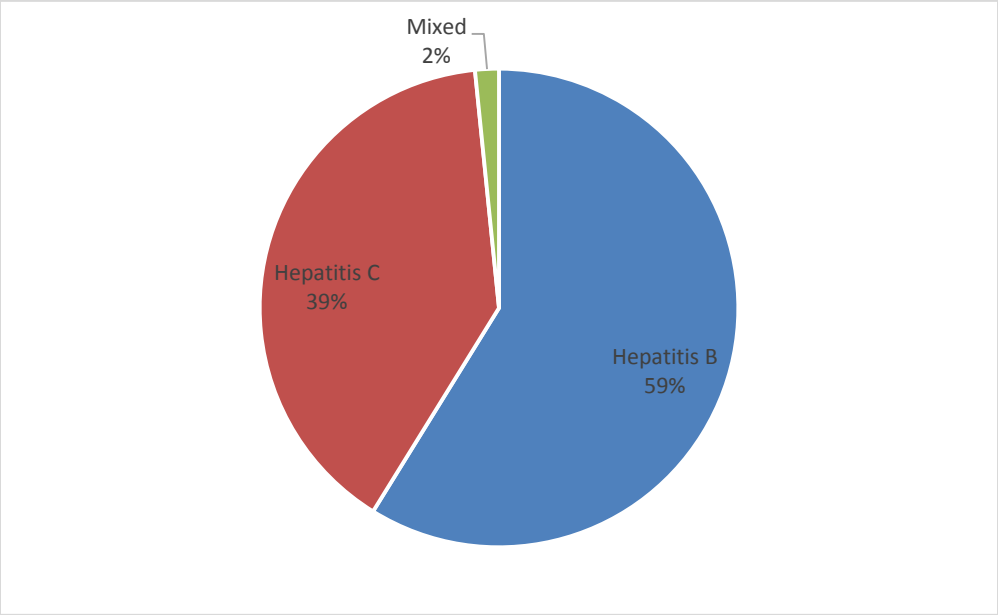


Fig.1 Pie chart of hepatitis infections

5.3 Trends of HBV and HCV infection

High percentage of HBV was reported in month -2 and 6 with 19% and 15% followed by month 1 and 7,8 with 14.9% and 14.3% respectively, while least was reported in month 5 with 10.1%(table 3).

High percentage (14.1%) of HCV was reported in month-2, followed by 12% in month -6 and the least was reported in month -5 with 4.3%. High percentage of mixed infection 2%, followed by month-1(0.8%) and other left months hadn't mixed infection (table 3).

Table-3: Hepatitis Band C case distribution in Halaba primary hospital from 1-8/2012

Month/2012	Clinically suspected	Hepatitis cases		
		Hepa B (%)	Hepa C (%)	Mixed
01	121	18(14.9)	14(11.6)	1(0.8)
02	142	27(19)	20(14.1)	0
03	94	12(12.8)	6(6.4)	0
04	84	11(13.1)	5(6)	0
05	69	7(10.1)	3(4.3)	0
06	100	15(15)	12(12)	2(2)
07	91	13(14.3)	9(9.9)	0
08	49	7(14.3)	5(10.2)	0
Total	750	110(14.7)	74(9.9)	2(0.27)

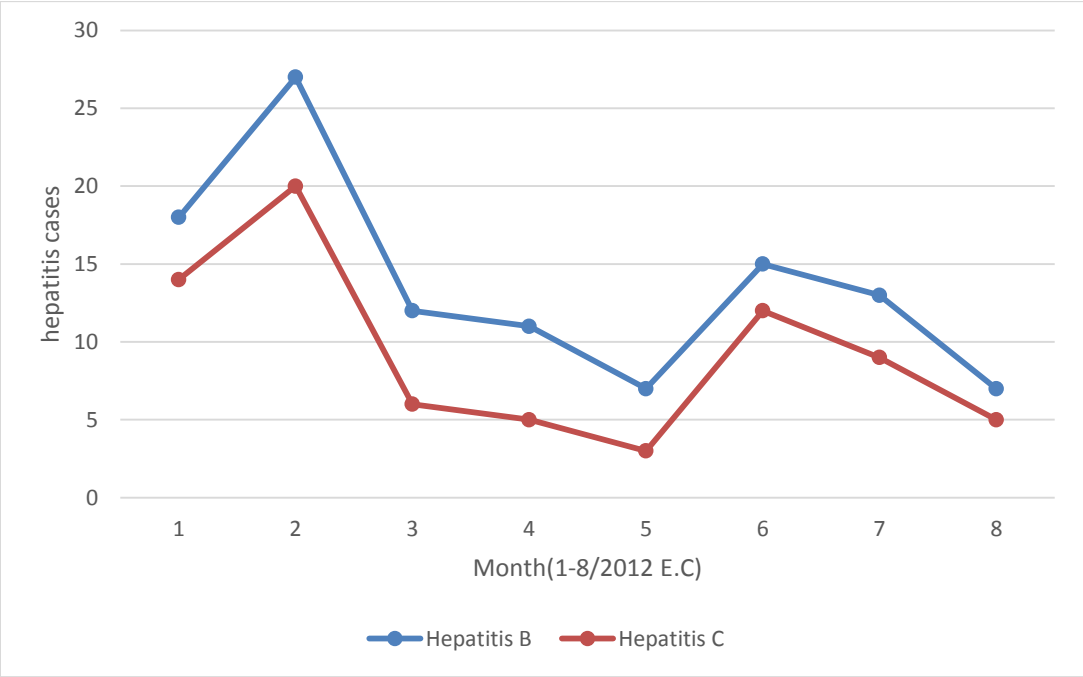


Fig. 2 Overall trend of Hepatitis B and C infection prevalence at Halaba Kulito primary hospital from 1-8/2012

5.4 Hepatitis B and C infection distribution among residence at Halaba primary hospital

Both hepatitis B and C virus infection was highly prevalent in patients came from Weyira Zuriya woreda(40 vs 23 cases) and followed by Atoti Uullo woreda(31 vs 22 cases)(figure3). However, hepatitis B and C virus infection proportion difference with regard to residence was not statistically significant (p=0.351 vs p=0.756) (table2).

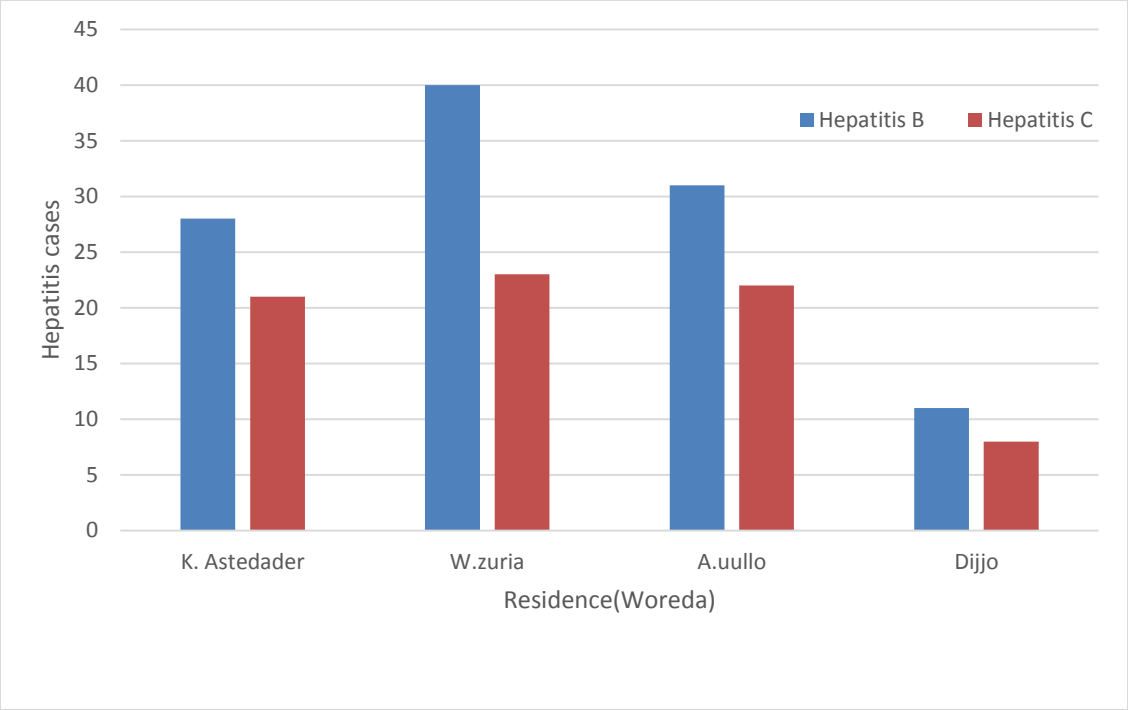


Fig. 3 Hepatitis B and C infection distribution among residence at Halaba Kulito primary hospital from 1-8/2012

Chapter-6 Discussion

The study was aimed at estimating Sero-prevalence of HBV and HCV among patients attending at Halaba hospital, South Ethiopia Region from 2019 to 2020. In this study over the 8 months period, the total number of HBV and HCV tested patients was 750. The majority of participants in our study were age group of 21 to 29 years (50.8 %). This is similar with the figures published by the World Health Organization (WHO) which reported that around 45 % were aged 22 or more (22).

In this study the overall prevalence of HBV and HCV in Halaba Hospital over last 8 months was 14.7% and 9.9% respectively. These were higher than the finding at the Sihanouk-Hospital–Center-of-Hope(SHCH) in Phnom Penh, Cambodia with 11 % and 5.3% for HBV and HCV respectively (26), Rwanda 3.7 % (26), Guinea-Bissau 4.2 % (21), Gojjam zone North West Ethiopia 4 %(28).

Our finding was lower when compared to a study in Nigerian Tertiary Hospital with HBV and HCV report 28.4% and 14.7% (22), Vietnam 43.8 % (26).The reason for the relatively lower rate of sero prevalence of HBV and HCV in this study compared with other studies may be because of existence of different magnitude of risk factor for contracting the infection and may be also the screening technique used.

Hepatitis B is one of the most infectious diseases; it has infected around 2 billion people worldwide, including an estimated 400 million chronically infected cases. It is also hyper endemic in sub-Saharan Africa and Asia (28). In our study the prevalence rate of HBs Ag was 14.7 %. This figure is higher than study result conducted among blood donors in India 2.15% (23).

Our study finding is higher than 3.5% in Pakistan and neighboring Eritrea 4 %,Gondar University Teaching Hospital 4.7 % (26), among VCT clients, 6.3 % (43) among medical waste handlers, 4.9 % (44) among pregnant women attending ANC and also higher than 7 % (45) community based survey in Addis Ababa.

From our study finding the prevalence of mixed HBV and HCV infection was 0.4 % which is lower than the study finding in Vietnam 6.5 %, Nigerian Hospital 3.9 % (26).

From our study, the prevalence rate of HCV was 9.9%, this is low when compared with 14.7% of HBV. The low prevalence of HCV when compared with HBV might be due to the fact that HCV is less infective when compared with HBV, and HCV is transmitted mainly through transfusion of blood or blood products, intravenous drug abuse and needle sharing which may not common in Ethiopian.

In our study the sero-prevalence of HBV and HCV was higher among females compared to male study participants. The findings may be due to less number of males being tested or inappropriate recording of male data in logbook; therefore fewer males are screened compared to females.

Chaper-7 Conclusion and Recommendation

7.1. Conclusion

The prevalence of HBV and HCV at Halaba Hospital was 14.7% and 9.9 % respectively. Proportion of positive HBV and HCV was high among males than females. HBV infection was high in the < 21 age followed by 21-29 years whereas HCV infection high found in 30-41 age interval followed by 21-29 years. HBV infection was high in Weyira Zuria woreda followed by Atoti Uullo whereas, HCV infection high found in Atoti Uullo followed by Dijjo Weyira.

7.2. Recommendation

The high rate of HBV and HCV infection warrant the strengthening of prevention and control strategies in the study area. Therefore, Halaba Health Bureau should be strengthened in Health education about the transmission, prevention and awareness of HBV and HCV infections In addition, Federal Ministry of Health should expanded plan for immunization for Hepatitis B Virus.

Chapter-8 Limitation of the study

The current study was based on retrospective review of monthly summary record at Halaba Hospital, which limits the independent variables to only sex, age, month and residence. Also The absence of complete data in the recorded log book.

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Annex

Annex I: Data collection sheet

ID	Sex	Age	Residence(Woreda)	Date/month	Hepatitis B test result	Hepatitis C test result

Annex II: Standard operating procedures

1. For HBSAg

Purpose	This procedure provides instructions how to performHBsAg test which isarapid, qualitative,twositesandwichimmunoassayforthedetectionofHepatitis Bsurfaceantigen,amarkerforHepatitisBinfections,inserum/plasmaspecimen.
Abbreviations	HBsAg –Hepatitis B surface antigen
Principle	As a test sample flows through the membrane assembly of the test device, the coloured monoclonal anti-HBsAg-colloidal gold conjugate complexes with the HBsAg in the sample. This complex moves further on the membrane to the test region where it is immobilized by another monoclonal anti-HBsAg antiserum coated on the membrane leading to formation of a pink-purple coloured band which confirms a positive test result. Absence of this coloured band in the test region indicates a negative test result. The unreacted conjugate and unbound complex if any move further on the membrane and are subsequently immobilized by the anti-rabbit antiserum coated on the membrane at the control region, forming a pink-purple band. This control band serves to validate the test results.
Materials	**Reagents** HBsAg Testkit **Reagents preparation: N/A** **Reagents stability and storage:** Thesealedpouchesinthetestkitmaybestoredbetween4-30^{0}Ctillthedurationoftheshelflifeasindicatedonthe pouch.**DONOTFREEZE!** **Supplies**
Sampl e	

Sample type	Amount required	Transport and Storage	Stability
Serum or Plasma	0.5ml	2-8C^{o}	7 days

Limitations:
Donotusehemolyzed,turbidorcontaminatedsamples.Turbidsamplesshouldbecentrifugedandclear supernatantmustbeusedfortesting

Sample retention: Samples are discarded after 7 days.

Procedure

Step	Action
1	Bringthesealedpouchtoroomtemperature,openthepouchandremovethedevice.*Onceopened,thedevicemust beusedimmediately.*
2	Dispense two drops (50µl) of serum/plasma specimen into the sample well 'S' using the dropper provided
3	At theendoffifteenminutesreadtheresultsasfollows: **NEGATIVE**:Onlyonepink-purplebandappearsatthecontrolregion'C' **POSITIVE**:Inadditiontothecontrolband,apink-purplebandalsoappearsatthetestregion'T'.

Special Safety Precautions

- Wear gloves, eye protection, and protective clothing at all times in the laboratory**.**
- Any chemical spilled on your skin or your clothing, should be washed immediately and thoroughly.

	• Refer to safety manual for additional safety precaution information.
Quality Control	Pink-purplebandappearsat inbuilt internal control **Control preparation: N/A**
Result Interpretation	• **NEGATIVE**:Onlyonepink-purplebandappearsatthecontrolregion'C' • **POSITIVE**:Inadditiontothecontrolband,apink-purplebandalsoappearsatthetestregion'T'
Expected Values	A healthy person with antigen negative for hepatitis
Limitations	Interferenceduetoheterophileantibodies,Rheumatoidfactorsandothernonanalytesubstancesinpatient'sserum, capableofbindingantibodiesmultivalentlyandprovidingerroneousanalytedetectioninimmunoassays,hasbeen reported in various studies.
Related Procedures and Documents	• Safety Manual • Quality control Manual • Quality log sheet