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Magnitude of hepatitis B and C viruses' infection, knowledge, attitude and practice on the disease among flying cabin crew of Ethiopian Airline group, Ethiopia

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This thesis prepared by Wasihun Sebesbe which is titled Magnitude of hepatitis B and C viruses' infection, knowledge, attitude and practice on the disease among flying cabin crew of Ethiopian Airline group, Ethiopia**.** This thesis is my unique work and submitted for the partial fulfillment of the requirements for the degree of Master of Sciences in Clinical Laboratory Sciences (Diagnostic and Public Health Microbiology). It complies with the regulations of the University and meets the accepted standards with respect to originality and quality. All sources of material used for the thesis has been accordingly acknowledged.

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Abbreviations

AAU	Addis Ababa University
Ab	Antibody
Ag	Antigen
CCS	Cabin Crews
CDC	Center for Disease Control
CHBV	Chronic Hepatitis B virus
CHCV	Chronic Hepatitis C Virus
C-line	Control- line
ELISA	Enzyme Linked Immune Sorbent Assay
HAV	Hepatitis A Virus
HBsAg	Hepatitis B Surface Antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HCW	Heath Care Worker
KAP	Knowledge, Attitude and Practice
MD	Medical Doctor
MRO	Maintenance, Repair and Operations
PI	Principal Investigator
SOP	Standard Operating procedure
SPSS	Statistical package for the Social Science

SST	Serum Separator Tube
T-line	Test line
UN	United Nation
UNWTO	United Nations World Tourism Organization
USA	United States of America
WHO	World Health Organization

Abstract

Back ground: World health organization reported that an estimated 1.4 million deaths occur per year from acute infection and hepatitis-related liver cancer and cirrhosis. This is at comparable to that of HIV and tuberculosis, placing a large number of travelers at risk of both HBV and HCV infections worldwide. With the rise in international travel over the last three decades, many travelers are at risk of HBV and HCV infection. Flying cabin crews are considered to be international traveler.

Objective: To assess the magnitude of Hepatitis B and C Virus, Knowledge, Attitude and Practice towards Hepatitis B and C virus infection among flying cabin crew of Ethiopian airline group.

Methods: Institutional based cross-sectional study among 411 flying cabin crew of Ethiopian airline group was conducted from December 2019 to May2020. The KAP towards HBV and HCV was gathered using structured questionnaire. About four ml of venous blood sample using SS tubes was collected. And rapid screening test for both HBsAg and anti-HCV Ab Ab was performed from serum sample. Furthermore, positive samples by the rapid screening test were confirmed by using a confirmatory enzyme linked immune sorbent assay test. Finally, the data were entered and analyzed using SPSS 25.v. statistical software.

Results: The magnitude of HBsAg among flying cabin crew of Ethiopian Airline group was 0.49 %(n=2/411) but there were no cases positive for anti-HCV Ab (n=0/411).Overall mean score of knowledge towards HBV and HCV was found to be 7.84 ± 1.10while that of attitude was 8.38 ± 1.10. Regarding to practice, 23.8% (98/411) of the participants were exposed to blood and/or body fluids of others, but only 20.2% of them get vaccinated.

Conclusion: According to this study, the magnitude of HBsAg and anti-HCV Ab among flying cabin crew of Ethiopian airline was low. Even though the magnitude is low, 23.8 % of them occupationally exposed to blood and/or body fluid of others. But only a fifth of them vaccinated. Since they are occupationally exposed for infection, continuing providing proper personal protective equipments, applying standard precautions and vaccinated all cabin crews should be the most crucial things.

Key words: HBV, HCV, knowledge, attitude, practice, flying cabin crews,

1. Introduction

1.1 Background

HBV is a double stranded DNA virus belongs to the family Hepadnaviridae. It replicates through an RNA intermediate and can integrate into the host genome. The nucleocapsid structure of HBV contains HBV genome with 3.2 kilo base in length and partially double-stranded relaxed circular DNA molecule [1].

HCV is a positive RNA virus with a genome containing approximately 9500 nucleotides. It has an open reading frame that encodes a large polyprotein of about 3000 amino acids [2].

World health organization reported that an estimated 1.4 million deaths per year occur from acute infection and hepatitis-related liver cancer and cirrhosis which is atoll comparable to that of HIV and tuberculosis. Of those deaths, approximately 47%are attributable to hepatitis B virus, 48% to hepatitis C virus and the remainder is due to other hepatitis [3,4].This indicate that hepatitis B and Hepatitis C are the leading cause of death as well as acute liver infection and cancer.

Hepatitis B and hepatitis C are cause potentially lethal inflammation of the liver, which is characterized by acute and chronic forms of liver disease and finally cause death. These two viruses are responsible for 96% of all hepatitis mortality [4].

Viral hepatitis B and C are blood-borne infections, with significant transmission occurring in early life and through unsafe injections, sharing sharp materials, body fluids and unsafe medical procedures. These viruses are transmitted vertically at birth, horizontally through unprotected sex, sharing of injecting equipment and close contact between infants and neonate, through unscreened blood products is another route of transmission since blood remains infectious for several weeks even when dried [5].

Because of its high magnitude almost all over the world, the global response to viral hepatitis entered a new phase in 2015, when the UN general assembly adopted 2030 for sustainable development which called on the international community to fight hepatitis. Following the global hepatitis response by the UN general assembly the world health assembly adopted WHO first “Global health sector strategy on viral hepatitis” with elimination as its overarching vision [6].

WHO categorizes the magnitude of HBV regions as low (<2%), medium (2% to 8%), and high (>8%).Hepatitis B virus magnitude is highest in sub-Saharan Africa and East Asia; where between 5–10% of the adult population is chronically infected. In the Middle East and the Indian subcontinent, an estimated 2–5% of the general population is chronically infected [7].

With the rise the number of international travelers over the last three decades, many travelers are at risk of HBV and HCV infection. The United Nations World Tourism Organization (UNWTO) estimates that internationally there were just 25 million tourist arrivals in 1950. But 68 years later this number has increased to 1.4 billion international arrivals per year [8].
Ethiopian airline has about 125international destinations and planned about 22million passengers annually to serve after the expansion of the airport [9].
Therefore, both Asia and Africa are the frequent destinations of Ethiopian airline. Flying cabin crews are considered to be an international traveler even though the traveling purpose is job related. Because of frequently travelling they may be exposed for HBV and HCV infection due to personal behavior and/or job related as they are traveling including in high magnitude of HBV and HCV infection regions.

The KAP survey is a method that provides access to quantitative and qualitative information. A KAP survey fundamentally records personal opinion. In other words, the KAP survey reveals what was said, but there may be considerable gaps between what is said and what is done. From the survey the participants can enhance their knowledge attitude and practice. It is also possible to fill the gap based on the survey result. In addition, it also used as reference for future studies [10].

1.2 Statement of the Problem

HBV and HCV infections are one of the major public health problems worldwide. Both infections are common causes of chronic liver diseases. They are transmitted through contaminated blood, semen and body fluids. They can also be transmitted by sexual intercourse and mother-to-child [11]. Both types of viral hepatitis are endemic in Ethiopia. According to WHO report an estimated 1.4 million deaths per year occur from acute infection and hepatitis-related liver cancer and cirrhosis which is atoll comparable to that of HIV and tuberculosis infection, placing a large number of travelers at risk of both HBV and HCV infection worldwide [7,12]. About 10% of the world population is said to be infected with Hepatitis B virus. In sub-Saharan Africa the average magnitude ranges 10-20% and in Ethiopia the magnitude of HBV and HCV among patients with chronic liver disease are said to be 35.8% and 22.5%, respectively [13]. To overcome the burden, early screening is important as treatment to infection with the viruses is very expensive. Any one if get a chance to check the status of hepatitis virus, it is better to take a measure based on his/her status of the virus. That is, if he/she is negative for both viruses, better to get vaccination for hepatitis B virus. If he/she is positive for either of the two viruses it is mandatory to start an early follow-up.

With the rise in the number of international traveler, many travelers are at risk of HBV and HCV infection. The United Nations World Tourism Organization (UNWTO) estimates that internationally there were just 25 million tourist arrivals in 1950. In the year 2018 this figure becomes increased to 1.4 billion international arrivals per year [8, 14].

Flying cabin crews are one of the population groups with occupational risk to the viral infections because they travel to many countries and deal with many travelers and sick passengers. Travels to countries of high magnitude of HBV and HCV regions, like Asia and different parts of Africa put them to be at risk for the viral infections [14].

But there is a limitation of data that shows the magnitude, knowledge, attitude, and practice of hepatitis B and Hepatitis C virus infections in this particular group in our country and at large worldwide. Therefore it was a genuine concern to assess the magnitude of the viral infections among the group. It was also essential to assess knowledge, attitude and practice among them in order to create awareness and design preventive measures.

1.3. Significance of the study

This study can provide the following information.

- Based on the findings the Ethiopian airline medical unit can take an appropriate follow up and measure to prevent the dangerous outcomes of the virus for those positive groups. And also can provide vaccination for HBsAg negative groups.
- The Ethiopian medical unit can use the information to formulate the prevention and control mechanisms of the problems.
- It also serves as references for the future study

2. Literature review

2.1 Hepatitis magnitude

There was no enough data performed and accessed on this particular study subjects worldwide and especially in our country. Therefore the literature review was based on other related risk groups like other international travelers and health care workers and in addition community based studies.

A cross-sectional study conducted in Norway (Oslo) in Dec. 2000, by Health, Environment and Safety department of Scandinavian Airlines System, to detect the magnitude of antibodies against hepatitis A, B, C, and E viruses in flying airline personnel, and to determine the necessity of hepatitis A vaccination to prevent such infections related to occupational exposure. In this study a total of 611 airline personals (208 flying personnel, 199 ground crew, and 204 employees from companies not involved in travel activities) were involved. The result was stated as follows, Magnitude of antibodies against HBV and HCV was low in each of the three groups and there were no differences between the three groups [15].

The head of infectious disease and international medicine, branch of medicine, University of Minnesota in USA review diverse kinds of articles done on international travelers and they found that the monthly incidence of hepatitis B virus (HBV) gaining in long-term travelers to endemic countries various from 25 to 420 per 100,000. In the same point, a study of short-term travelers from Australia to Asia examining paired pre-travel and post-travel tests explained a much lower incidence of 2.19 new hepatitis B infections per 10,000. This is in conformity with study of Danish travelers where the monthly incidence of HBV was estimated to be 10.2 per 100,000[16].
A prospective observational study of ill-returned travelers who presented at two travel medicine clinics in Israel between the years 1997 and 2012 to describe the epidemiology of acute viral hepatitis among travelers returning from tropical countries was conducted. Among 4,970 Israeli traveler, two cases acquirer HBV and the other one case HCV [17].
A retrospective study conducted to assess the magnitude of chronic hepatitis B and C infection among Mongolian immigrants in the Washington district of Colombia by using the data obtained from community health screenings held from 2016 through 2017. From 634 participants eighty-two participants (12.9%) had chronic HBV or HCV infection after accounting for HBV and HCV co-infection. Thirty-nine (6.2%) were chronically infected with HBV, and 233 (36.8%)

were susceptible to HBV. Sixty-three (9.9%) participants were positive for HCV exposure, and 45 (7.1%) had confirmed chronic HCV infection [18].

A cross-sectional study conducted in the Northern part of China from June 2016 to August 2016 for a consecutive three months with a total study participant of 6541, 3.8% and 0.36% tested positive for hepatitis B surface antigen (HBsAg) and anti-HCV Ab, respectively. The HBsAg and anti-HCV Ab positive rate were significantly higher in male participants (4.8% and 0.43% respectively) than female participants (3.0% and 0.33%) [19]

A retrospective study conducted in Belgium on registered data from 1996 to 2015.From all registered data7892 (1.8%) patients were screened for hepatitis B surface antigen (HBsAg) and 7206 (1.6%) for hepatitis C antibody HCVAb) of whom 369 (4.7%) and 163 (2.3%) tested positive, respectively [20].

A cross-sectional study of the magnitude of hepatitis B and C infection was conducted in Bangladesh at Mymeningh City from Desember1, 2017 to Desember31, 2018, with 1938 participants. The result was 14.8% and 6.9% for HBsAg and anti-HCV Ab respectively [21].

A systemic review and Meta-analysis on the magnitude of HBsAg in health care workers from Eastern Medeteranian and Middle eastern countries was conducted, reviewed and reported as the Magnitude of HBsAg in Sudan, Pakistan, Moroco and Iran was 16%, 4.7%, 1% and 0.2% respectively [22].

A cross-sectional study was conducted in Rwanda from March2018 to October2018 to assess the magnitude of hepatitis B. From a total of 327, 360 study participants 12,865 (3.9%) were positive for HBsAg [23].

In Cameron, a cross-sectional study was conducted from March 2017 to July 2017 to assess the sero-magnitude of hepatitis B surface antigen infections. There were total study subjects of 262. From 262 participants 33 were positive for HBsAg, which gives an overall magnitude of 12.6% [24].

A community based cross sectional study was conducted In Addis Ababa Ethiopia among 454 apparently healthy women from May 2016 to June 2017 to assess the magnitude of hepatitis B and C viruses. Sero-magnitude of HBsAg and HCV was found to be 3.7% and 2.0%, respectively [25].

2.2 Knowledge, Attitude and Practice

A cross-sectional pilot survey was conducted by the European traveler health advisory board in nine major airports of European boarding gates, to evaluate the current travel health knowledge, attitudes and practices (KAP) and to determine where travelers going to developing countries obtain travel health information. The study was done between September 2002 and September 2003, among 5,465 voluntary passengers. In spite of a generally positive attitude towards vaccines, 58.4% and 68.7% of travelers could not report any protection against hepatitis A or hepatitis B, respectively. They conclude that the results of this large-scale airport survey clearly demonstratean important educational need among those traveling to risk destinations [26].

A cross-sectional study was conducted among 404 USA international travelers at JohnF.Kennedy International Airport in New York from15 January to 22 January 2003, to evaluate the knowledge, attitude and practice of malaria and vaccine preventable disease like HBV. Although the majority of travelers believed that vaccines were effective for prevention only 16% were vaccinated for HBV [27].

A cross-sectional study was performed in Northern Vietnam to evaluate the magnitude of knowledge attitude and practice of health students towards hepatitis B virus infection from February2017 to August 2017 for the continuative of seven months. Among 314 study subjects, majority of the participants (74.6%) were aware that hepatitis virus can cause serious complications such as liver cirrhosis, liver failure, liver cancer or premature death.75.5% did not know HBV infection at birth carries the highest risk of developing chronic infection. The median knowledge score was 25 out of 42 (59. 5%).About one third (30.2%) wrongly believed that HBV can be transmitted through eating or sharing food with chronic hepatitis B patients. About 38.8% did not feel confident that the hepatitis B vaccine is safe. Only 30.1% provided correct answers to all the questions on injection safety [28].

The Cross-sectional study was conducted in Nigeria among medical students in tertiary teaching hospital to evaluate the knowledge of hepatitis infection. The study had done in August 2015. A total of 202 medical students with the age range of 19 to 36 years were participated. The result was general knowledge 79.2%, on risks factors and mode of transmission of virus 74.9% whilst on prevention was 89%. And they conclude that the medical students had good knowledge of the Hepatitis B virus [29].

A cross-sectional study, using a questionnaire was conducted in Egypt, among doctors to assess the knowledge, attitude and practice for hepatitis C virus infection. The study was conducted from May2015 to April 2017 with a total of 355 participants. Most of the physicians (89.6%) regardless of their years of experience have had contact with blood products. Those who had a history of needles tick injury accounted for 56.3%, with a statistically significant differences to the highest number being middle career physicians. Concerning knowledge about infection control policies in their hospitals, it was relatively low among all groups. They conclude that, despite all efforts exerted by the infection control professionals, infections still remain a major unpleasant side effect of health care, often causing harm to patients [30].

In India, at private medical college Kochi a cross-sectional study was conducted in November 2017, to assess knowledge, attitude and practice among medical students about hepatitis B virus infection. The total participants were 230. Among 230 medical students, 79.1% students had good knowledge about hepatitis B whereas 84.3% of the respondents had the right attitude towards hepatitis B. The practice component was low with only 44.8% of the respondents having correct practice regarding hepatitis B infection. They conclude as, although the knowledge and attitude regarding hepatitis B infection is high, the practice levels are low indicating the need to encourage proper practices among the medical students [31].

A cross sectional- KAP survey was conducted from November 2017to February 2018 amongst undergraduate and graduates of Baqai dental college in Pakistan. The study population included undergraduates and graduates of Dental College, A total of 165 undergraduates and graduates participated in the study. Regarding Hepatitis B transmission through saliva, 25(83.3%)
of third year students, 43(72.9%) of the final year students, 35(76.1%) of house surgeons and 23(76.7%) of faculty members were aware of salivary transmission [32].

An institution based cross-sectional study was conducted at Jimma University Medical Center from 11 Nov 2015 to 09 Jan 2016, among 810 healthcare workers to assess KAP towards hepatitis B and C virus infection. From the respondents, 73.9% and 60.9% had good overall knowledge about hepatitis B and hepatitis C viruses. Concerning to attitude most of the respondents (88.7%) had a positive attitude towards standard precautions and only less than half98 (42.6%)) of the respondents had a good overall practice of standard precautions [33].

3. Objectives

3.1 general Objective

To assess the Magnitude of hepatitis B and C viruses' infection, knowledge, attitude and practice on the disease among flying cabin crew of Ethiopian Airline group

3.2 Specific objectives

- To determine the magnitude of HBVand HCV among flying cabin crews of Ethiopian airlines group
- To assess the Knowledge of flying cabin crews of Ethiopian airlines group about HBV and HCV
- To assess the attitude of flying cabin crews of Ethiopian airlines group about HBV and HCV
- To assess the practice of flying cabin crews of Ethiopian airlines group towards HBV and HCV prevention

4. Hypothesis

The null hypothesis is rejected. As a result, there is difference in the magnitude of hepatitis B and C virus among flying cabin crews of Ethiopian airline group compared to previous studies conducted in Ethiopia among community based studies in Addis Ababa [22].

5. Materials and Methods

5.1. Study area

Ethiopian Airlines Group is the state-owned corporate entity of Ethiopia's flagship carrier. Founded in 21-Dec-1945, the Government of Ethiopia established the airline group as a provider of aviation services including cargo, maintenance, repair and operation (MRO), aviation training, ground handling and catering services. Ethiopian Airlines Group also has stakes in the following carriers; ASKY Airlines (40% stake, launched in Jan-2010), Tchadia Airlines (49% stake, launched in Oct-2018), Ethiopian Mozambique Airlines (minority stake, proposed launch on 01-Dec-2018). Ethiopian airline has 125 destinations as of July2019. But this study was conducted only in the Medical unit of the head quarter of the corporate. Ethiopian has many divisions and departments in it. The medical unit is one of the departments. It gives medical services to all employees, provides periodical medical check up to flying cabin crews, cockpit crews and some ground staffs. Each day hundred fifty to two hundred employees visit the medical unit for treatment and periodic exam. Cabin crews constitute about a tenth of the daily visitors to the medical unit. The study participants were cabin crews who visit the medical unit during the study period.

5.2. Study Design and period

Institutional based cross-sectional study was conducted to assess the magnitude of hepatitis B and C virus, and KAP among flying cabin crews of Ethiopian airline from December 2019 to May2020.

5.3. Population

5.3.1. Source of population

The source of population was all cabin crew of Ethiopian Airline group.

5.3.2. Study population

The study population was all cabin crews of Ethiopian airline group who were visiting the medical unit in the study period and fulfill the eligibility criteria.

5.4 Inclusion criteria

All flying cabin crew of Ethiopian airline group who visit the medical unit and volunteering to participate in the study program

5.5. Study Variables

5.5.1. Dependent variables

- Level of hepatitis Band C virus infection among the study subjects
- The knowledge, attitude and practice of the study subjects towards HBV and HCV

5.5.2. Independent variables

- Socio-demographic variables like Age, Sex, marital status, service of years, Nationality and educational back ground

5.6. Sample size calculation and Sampling methods

5.6.1. Sample size calculation

The total sample size was calculated using two formulas that used to the calculation of infinite and finite populations as follows;

First, calculate the infinite population sample size using the following formula.

$$\mathbf{n= \frac{Z^2_{\alpha/2}PQ}{d^2}}$$

Where: n= sample magnitude; Zα/2 = standard normal distribution abscissa corresponding to

95% confidence interval (1.96); P = proportion of 50%,Q = (1-P); and d = desired level of precision (5%).Therefore using the above formula the minimum sample size was:

$$n= \frac{(1.96)^2 x0.5(1-0.5)}{(0.05)2} = 384.16$$

Secondly, since the source population is finite (less than 10,000), it is advisable to use the finite (adjusted) sample size calculation. **Na=Nu/ 1+Nu/N**

Where Na=adjusted sample size, Nu=unadjusted sample size, N=source population. Here the source population, which is the number of cabin crews in the company, is known. It it as N=3000, the calculation will be as follows:

Na=384/1+384/3000=384/1.13 = 340. The adjusted sample was 340 plus 10% addition to compensate for non-response rate to reduce errors arising from the likelihood of non-compliance. Therefore, the final sample size was 340+34 = **374** ccs. But we increase the simple size to 411

5.6.2. Sampling Method

Convenient sampling technique was used to select study participants who were visiting the medical unit during the study period.

5.7. Measurement and Data collection methods

5.7.1. Data collection methods

First the consent obtained from study participants and secondly structured questionnaire was used to collect information about knowledge, attitude and practice of the study participants about hepatitis B and C virus infections. The socio demographic characteristics of the study participants were collected. The questionnaire prepared in English language in simple and understandable content since foreigner employees were included in the study. All laboratory personnel were trained about the project. Before the actual data collection, the briefing of how to collect and label blood sample, and questionnaire for this actual purpose were introduced and demonstrated.

5.7.2. Laboratory analysis

5.7.2.1. Blood sample Collection and Serological test

After obtaining the participant written consent, 4ml of blood sample was collected from flying cabin crews using serum separator tube under aseptic condition to obtain serum sample. The tubes labeled properly and put for about fifteen to thirty minutes at ambient temperature. The blood samples centrifuged for 10 minutes at speed of 3000rpm and the serum were separated. The separated serum samples tested for hepatitis B surface antigen and/or anti-HCV Ab with rapid screening method according to the manufacturer's instruction of the selected test kit. Samples tested positive by rapid test were confirmed with ELISA test. The raped test kit was

selected based the highest sensitivity and specificity. As a result, the name of the test kit was Onsite rapid immune chromatographic test. It is produced by CTK Biotech.inc, USA. The relative sensitivity and specificity of HBsAg was 97.3% – 100% and 99.5% - 100% respectively, While that of ant-HCV Ab was 98.7% and 99.6& respectively.

I. Rapids test principle and interpretation for HBsAg and anti-HCV Ab tests

a) HBsAg rapid test;

It is a lateral flow chromatographic immunoassay. The test cassette consists of a burgundy colored conjugated pad containing mouse anti-HBsAg antibody conjugated with colloidal gold and control antibody conjugated with colloidal gold and a nitrocellulose membrane strip containing a test line (T line) and a control line (C line). The T line is pre-coated with non-conjugated HBsAg antibody and a C line pre-coated with a control line antibody. When two drops of sample is dispensed in to the sample well of the cassette, the sample migrates by capillary action across the test cassette. If HBsAg present in the specimen, will bind to the anti-HBS antibody conjugates. The immunocomplex is then captured on the membrane by the pre-coated non-conjugated HBsAg antibody will form a burgundy colored T line, indicating HBsAg positive test result. Absence of the T line suggests a negative test result. Additionally, the test contains an internal control (C line) which should exhibit a burgundy colored line of the immunocomplex of the control antibodies, regardless of any color any color on the T line. If the C line does not develop, the test result is invalid and the sample must be re-tested with another device [Test kit leaflet]

b) Anti- HCV rapid test;

It is a lateral flow chromatographic immunoassay as that of HBsAg test. The test cassette contains two sites which labeled as T and C. The T line stands for test line while the C line for control line. As the sample flow through the membrane of the test cassette, the test color HCV antigen colloidal gold conjugate complexes with anti-HCV Ab in the sample. This complex moves further on the membrane to the test site where it is immobilized by another HCV antigen coated on the membrane leading to formation of a pink-purple color band which confirms a positive test result. Absence of this color band in the test region while present in control site indicates a negative test result. The absence of pink purple band in the control line indicates the invalid test result [Test kit leaflet].

II. ELISA tests for HBsAg

The basic principle of an ELISA is to use an enzyme to detect the binding of antigen (Ag) antibody (Ab). The enzyme converts a colorless substrate (chromogen) to a colored product, indicating the presence of Ag/Ab binding. An ELISA can be used to detect either the presence of Ags or Abs in a sample, depending on how the test is designed [Test kit leaflet].

Direct ELISA test principle

The direct ELISA is a test for the detection of antigen using specific immobilized antibody. The principle of direct or sandwich ELISA test is described as follows; 1) plate is coated with a capture antibody; 2) sample is added and any antigen present bind to capture antibody; 3) detecting antibody is added, and binds to antigen; 4) enzyme-linked secondary antibody is added, and binds to detecting antibody;5) substrate is added and converted by enzyme to detectable form. The intensity of the color is directly proportional to the concentration of antibody in the serum [Test kit leaflet].

5.8. Data quality control

5.8.1. Pre analytical

The pre analytical quality control of this study was begin from the time of questionnaires preparations. The questionnaires were developed by reviewing different relevant literatures on the subject matter to ensure reliability and well addressed all the statement of question that enables me to assess all gaps in the study participants. Practical training was given for laboratory staffs on the purpose of study and procedures of data collection for one day before the beginning of the actual duty. During data collection, the principal investigator was received questionnaires from data collectors and review for completeness, accuracy, and consistency of the data. Checking for proper labeling, minimum volume and non hemolized blood sample is collected

5.8.2Analytical

The analytical phase of the quality procedure was mainly focused on the correct interpretation and reporting of both positive and negative results. To obtain the quality result mostly stacked on standard operating procedure (SOPS) of hepatitis B and C tests. Besides to follow the SOPS was using both positive and negative control sera for quality control test of each box or batch number of the test kit.

5.8.3 Post Analytical

In this phase the main process was checking the correct registration of all the necessary information about the test results and questionnaire. This process was essential to analyze and summarize the data in SPSS.v.25.

5.9. Data analysis and interpretation

Data was checked for the completeness and validity of information once the questionnaires and laboratory test results were collected from respondents and laboratory personals respectively. The verified data was entered into computer and analyze using SPSS v.25 software. In the analysis process, frequency distributions of variables and magnitude of HBsAg were analyzed in order to describe in relation with the study population.

To measure the levels of various aspects of Knowledge, Attitude and Practice (KAP), the questionnaires were divided into three distinct modules. In each module, standardized questions were asked. To assess knowledge, attitude and practices, 10, 9 and 9 questions were asked

respectively. Each questions in each module assigned a point and the respondents score were calculated on the basis of scalar-scoring method. Those respondents who obtained KAP score above 60% were considered as high level, while the scores between 50% and 60% were considered as medium level. The score below 50% was considered as Poor level. Also means and standard deviations were computed. All the categorical variables were presented as frequencies and percentages and all the continuous variables were showed as Mean ± Standard Deviation. To compare KAP scores, One Sample Independent T-test used to know the level of significance of variables. P –value < 0.05 considered statistically significant.

5.10. Operational definitions

Flying cabin crew: An employee, who serves and assists all passengers of the airline on board

Hepatitis B Positive: Those who were positive for HBsAg by rapid screening test and confirmed by ELISA

Hepatitis B Negative: Those who were negative for HBsAg by rapid screening test

Hepatitis C Negative: Those who were negative for Anti-HCV Ab by rapid screening test

Poor level KAP when the respondent score result about knowledge attitude and practice of HBV and HCV less than 50%.

High level KAP when the respondents achieve a result about knowledge attitude and practice of HBV and HCV greater than 60%.

Medium level KAP: when the respondents achieve a result about knowledge attitude and practice of HBV and HCV between 50% and 60%.

5.11 Ethical considerations

An ethical review committee of the Department of Medical Laboratory Sciences, College of Health Science, Addis Ababa University approved the protocol letter. The study was conducted in Addis Ababa at Ethiopian airline head office medical unit after permission obtained from the HR office of Ethiopian airline by providing the ethical letter approved by AAU. Names and any other sensitive personal information of individual study subjects were not recorded during sample collection and questionnaire interviews in order to secure individual private information. The test result of the study was kept by investigator confidentially. The study was not affected the study subjects since the test results were in secured and confidential way.

5.12 Dissemination of the result

The research can serve the Ethiopian airline medical unit, to begin the follow-up and to plan vaccination program for the study subjects and also for other employees. It also used as, a reference material to health professionals, researchers, experts and health policy makers for intervention. To reach these bodies the finalized paper submitted to Addis Ababa University, College of Health Sciences, School and Department of Laboratory Sciences and secured in public. The findings of this study will be distributed to federal ministry of health, other organization and different stakeholders through the appropriate channel. The finding will also be published in local or international journals.

6.0. Work flow

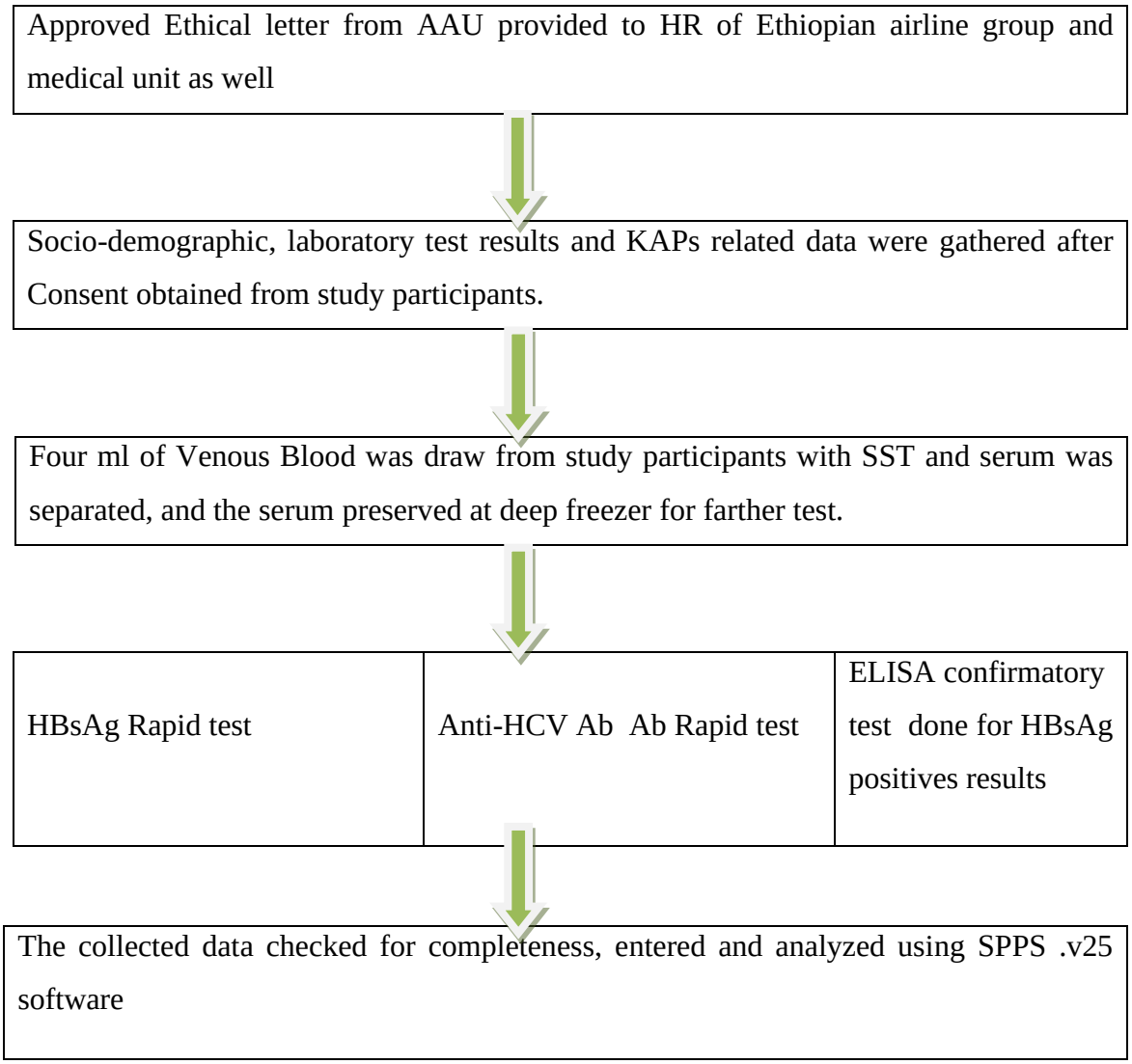

Figure 1 -Work flow diagram

7. Results

7.1 Socio-demographic characteristics

A total of 411 volunteer flying cabin crews have given their consent to be participating in the study and the questionnaires filled. The responding rate of the questionnaire was 99.8% (411/412). From the total of 411 participants 401(97.6%) were females. The age range of the participants was from 20-54years old with the mean age of 28.7 ±6.2SD. The Majority of them were in the age group of 26-35 years old. The majority of the participants 50.9% (209/411) were, married. Regarding to their educational back ground 65.5 %(269/411) of them were degree holder. Concerning to service of years most of them (88.8%) were in the range of 0.5 – 10years of service. About nationality issue 406 (98.8%) of the study subject were Ethiopian. The detail is shown below (Table 1).

Table 1: Socio-demographic Characteristics among flying cabin crew of Ethiopian Airline group, Ethiopia, January to May 2020 (n=411), 2020.

Socio- demographic variables		**Frequency (%)**
Sex	Female	401(97.6)
	Male	10(2.4)
	Total	411(100)
Age category	20 - 25	139(33.8)
	26 - 35	229(55.7)
	36 - 45	31(7.5)
	46 - 54	12(3)
	Total	411(100)
Marital status	Single	196(47.7)
	Married	209(50.9)
	Divorced	6(1.4)
	Total	411(100)
Educational Level	Diploma	72(17.5)
	Degree	269(65.5)
	Masters	13(3.2)

	Only Cabin crew certificate	57(13.9)
	Total	411(100)
Service Years Category	0.5 – 10	366(88.8)
	11 – 20	30(7.3)
	21 – 30	14(3.4)
	31 – 40	1(0.2)
	Total	411(100)
Nationality	Ethiopian	406(98.8)
	Other	5(1.2)
	Total	411(100)

Data shows in frequency and percentage N,(%)

7.2. Magnitude of HBV and HCV among flying cabin crew of Ethiopian airlines group

All participants were screened with rapid HBsAg and Anti-HCV Ab test. Accordingly only 0.49% (n=2/411) were positive for HBsAg but there were no cases for anti-HCV Ab (n=0/411). Those who were positive for HBsAg rapid test confirmed with ELISA test and there was no discrepancy in the two methods. Both cases were females with age group of 26 - 35 years old. Among them, one was married and degree holder while the other was single and with educational level of diploma. The detail is indicated below (Table 2)

Table 2.Magnitude of HBV among flying cabin crew of Ethiopian airlines group from January to May 2020 (n=411).

Variables		**HBsAg Serologic Negative**	**Both HBsAgand ELISA Positive**	**Total**
		N (%	**N (%)**	
Sex	Female	401(97.6)	2(0.5)	401
	Male	10(2.4)	0(0.0)	10
	Total	411(99.5)	2(0.5)	**411**
Age category	20 – 25	139(33.7)	0(0.0)	139
	26 – 35	227(54.9)	2(0.49)	229
	36 – 45	31(7.5)	0(0.0)	31
	46 – 54	12(2.9)	0(0.0)	12
	Total	409(99.5)	2(0.49)	**411**
Marital status	Single	192(46.7)	1(0.24)	193
	Married	208(50.6)	1(0.24)	209
	Divorced	9(2.2)	0(0.0)	9
	Total	409(99.5)	2(0.49)	**411**
Educational status	Diploma	71(17.3)	1(0.24)	72
	Degree	268(65.2)	1(0.24)	269
	Masters	13(3.2)	0(0.0)	13

	Only Cabin crew	57(13.9)	0(0.0)	57
	Total	409(99.5)	2(0.48)	**411**
Service Years Category	0.5 – 10	364(88.3)	2(0.5)	366
	11 – 20	30(7.3)	0(0.0)	30
	21 – 30	15(3.6)	0(0.0)	15
	31 – 40	1(0.2)	0(0.0)	1
	Total	409(99.5)	2(0.5)	**411**
Nationality	Ethiopian	404(98.3)	2(0.5)	406
	Others	5(1.2)	0(0.0)	5
	Total	409(100)	2(0.5)	**411**

Data shows in frequency and percentage N, (%)

7.3. KAP assessment of HBV and HCV infection among study groups

7.3.1. Knowledge of participants

In this study 95.4% (392/411) of the participants had heard or read about HBV and HCV from different sources. The major source of the information (42.7%) was social media. According to overall scoring of knowledge section 93.9% of respondents had high level of knowledge, 1.5% of respondents had medium level of knowledge 4.6% of them had poor level of knowledge (Table 3). The majority of the respondents know about the transmission of the viruses like, transmission through contaminated blood 87.3% (342/392), Contaminated body fluids 83.2% (326/392) and through sexual intercourse 65% (255/392). About 94.2% (369/392) and 75.9% (280/369) of the respondents informed that HBV has a vaccine and the full vaccination dose should be three times consecutively (Table 4).

Table 3.Knowledge level of flying cabin crew of Ethiopian airlines group (n=411)

Knowledge Level	High level of knowledge N,(%)	Medium level of Knowledge N, (%)	Poor level of Knowledge N, (%)
Frequency and Number of Participants	368/392 (93.9%)	6/392 (1.5%)	18/392 (4.6%)

Data shows in frequency and percentage N, (%)

Table 4.Knowledge assessment of HBV and HCV among flying cabin crew s of Ethiopian airline groups from January – May 2020 (N=411)

Question	Answers
Have you ever heard/read about hepatitis B and C	- Yes = 95.4%(392/411) - No = 4.6% (19/411)
What is your source of information?	Aviation Academe = 11.7% (46/392) - Social media = 42.7% (167/392) - College/University= 18.7% (73/392) - Friends = 26.9% (106/392)
Can you get hepatitis B and C infection through sexual intercourse?	- Yes = 65% (255/392) - No = 11.9% (47/392) - I don't know = 22.9% (90/392)
Can you get hepatitis B and C infection through blood contact?	- Yes = 87.1% (341/392) - No = 3.4% (13/392) - I don't know = 9.5% (38/392)
Is body fluid can cause infection of hepatitis B and C?	- Yes = 83% (325/392) - No = 2.2% (9/392) - I don't know = 14.8% (58/392)
Do Hepatitis B and c viruses transmitted through food?	- Yes = 2.9% (12/392) - No = 76.6%(300/392) - I don't know = 20.4% (80/392)
Are hepatitis B and C viruses 'curable diseases?	- Yes = 47% (184/392) - No = 21.9% (86/392) - I don't know = 31.1% (122/392)
Do hepatitis B and C can cause liver cancer?	- Yes = 65% (255/392) - No = 2.7% (11/392) - I don't know = 32.4% (127/392)
Does HBV have vaccination?	- Yes = 94.2% (369/392) - No = 5.8% (23/392)
How many doses of hepatitis B vaccine required for complete protection?	- Three times = 75.9% (280/369) - Two times =9.5% (35/369) - One times=14.6% (54/369)

Data shows in frequency and percentage N, (%)

7.3.2. Attitude of participants

According to overall scoring of attitude segment, 98.3% (404/411) of respondents had high level of attitude, 0.5% of respondents had medium level of attitude while the rest 1.2% of them had poor level of attitude (Table 5). In this part there were nine questions that used to evaluate the attitude of the participants. As a result, 97.3% (400/411) of the participants were agreed/strongly agreed that HBV and HCV are the major health problem of the community. About 77.2% (317/411) of the respondents agreed that they are occupationally at risk of infection and 91% (374/411) of them believed that vaccination is necessary. Only 2.4% (10/411) and 12.4% (51/411) of the respondents were not agreed and neutral that HBV vaccine is safe. Based on the prevention aspect they agreed/strongly agree that, hand washing 98.3% (404/411), wearing gloves 98.1% (403/411), and using hand sanitizer 88.8% (365/411) are the major practice of infection prevention of both viruses (Table 6).

Table 5: Level of attitude of flying cabin crew of Ethiopian airline group (n=411)

Attitude Level	High level of Attitude N,(%)	Medium level of Attitude N, (%)	Poor level of Attitude N, (%)
Frequency and Number of Participants	404 (98.3%)	2 (0.5)	5 (1.2)

Data shows in frequency and percentage N, (%)

Table 6.Attitude assessment of HBV and HCV among flying cabin crew s of Ethiopian airline group from January – May 2020 (n=411)

Indicate your level of agreement	Strongly agree	Agree	Neutral	Strongly disagree	Disagree
Hepatitis B virus is serious public health problem	243(59.1%)	157(38.2%)	8(1.9%)	1(0.2%)	1(0.2%)
You are at greater risk for hepatitis infection	174(42.3%)	143(34.8%)	60(14.6%)	24(5.8%)	9(2.2%)
It is necessary for you to receive hepatitis B vaccine	254(61.8%)	120(29.2%)	22(5.4%)	9(2.2%)	5(1.2%)
Hepatitis B vaccine is safe	187(45.5%)	162(39.4%)	51(12.4%)	5(2.2%)	5(2.2)
After exposure to body fluid vaccine reduces likelihood of being Hepatitis B positive.	125(30.4%)	148(36%)	96(23.4%)	33(8.0%)	8(1.9)
Training of Hepatitis Band C is important to booster your level of attitude about Hepatitis virus.	298(72.5%)	98(23.8%)	11(2.7%)	**0(0.0%)**	3(0.7%)
Hand washing is necessary before and after service giving of the passengers.	355(86.4%)	49(11.9%)	5(1.2%)	0(0.0)	1(0.2%)
Wearing gloves during collecting of used materials is necessary practice	359(87.3%)	44(10.7%)	6(1.5%)	1(0.2%)	0(0.0%)
After exposing to body fluids, Washing hands and using hand sanitizer can reduce the risk of Hepatitis B and C viruses infection	244(59.4%)	121(29.4%)	34(8.3%)	5(1.2%)	6(1.5)

Data shows in frequency and percentage N, (%)

7.3.3. Practice of participants

About 96.9 %(95/98) participants had positive attitude and taken an appropriate and immediate post exposure measure of prevention, even though 23.8% (98/411) of the participants were exposed to blood and/or body fluid of others. During lavatory cleaning, 80.3% (330/411) of the participant's wear gloves, while 19% (78/411) were practice hand washing before and after cleaning. With regard to vaccination states 20.2% (83/411) of them get vaccinated. More shown on (Table 7)

Table 7 Practice assessment of HBV and HCV among flying cabin crew s of Ethiopian airline groups from January – May 2020 (N=411)

Questions	**Answers**
Have you ever been exposed to blood and or body fluid of other person?	-Yes = 98/411 (23.8%) - No = 232/411(56.4%) -I don't remember = 81/411 (19.7%)
If yes to the above question what factor contributes to the exposure?	-Lack of infection prevention knowledge = 22/98 (22.4%) -Patient/passenger contact = 75/98 (76.5%) -Sharing sharp materials = 1/98 (1%)
If yes for question number 1, what measure do you take?	-Wash with soap, water and antiseptic = 95/98 (96.9%) -Go to health institute = 2/98 (2%) -Consult friends = 1/98 (1%)
Have you ever been screened and received hepatitis B Vaccine?	-Yes = 83/411 (20.2%) - No = 278/411 (67.6%) -I don't remember = 50/411 (12.2%)
If you did not vaccinated what was the reason?	-The vaccine is not easily available = 153/328 (46.6%) -Lack of information = 88/328 (26.8%) -Too busy = 58/328 (17.7%) -Due to needle phobia = 8/328 (2.4%) -Afraid of vaccines' side effect =21/328 (6.4%)

Do you have a habit of washing hands before and after ill passenger care?	-Yes = 397/411 (96.6%) -No = 14/411 (3.4%)
Do you have a practice of washing hands and using hand sanitizer when unwanted contact with passengers body fluids?	-Yes =401/411 (97.6%) -No = 10/411 (2.4%)
Do you have a practice of wearing gloves when you care your passengers (like during collecting of used cups and lunch/dinner boxes)?	-Yes =265/411(64.5%) -No = 146/411 (35.5%)
How do you practice during inspecting or caring of aircraft lavatory on air?	-By wearing gloves =330/411 (80.3%) -On bare hand = 3/411 (0.7%) -Washing hand before and after =78/411 (19%)

Data shows in frequency and percentage N, (%)

8. Discussion

This particular study intended to identify the magnitude of HBV and HCV and to assess KAP among flying cabin crew of Ethiopian airline group.HBV and HCV are widespread infectious diseases representing as one of the major health problems. It is also a well-known fact that international traveler are at risk of HBV and HCV infection [14]. Therefore it is a genuine concern to assess the magnitude and KAP of flying cabin crews in order to identify the gaps and create awareness and design preventive and control measures.

The main challenging issue of this study was the lack/limitation of similar and accessible literatures. Therefore, as that of literature review, the discussion part also based on other related and community based study literatures.

According to this study the magnitude of HBsAg and anti-HCV Ab among the study groups was 0.49% (2/411) and 0.0% (0/411) respectively, which was lower than previous study done in other risk groups, like international travelers and health care workers and community based studies. For example, Monthly incidence of hepatitis B virus among international travelers like, the University of Minnesota reviewed different articles done on international travelers and they found that the monthly incidence of hepatitis B virus (HBV) acquisition in long-term travelers to endemic countries ranges from 25 to 420 per 100,000[16]. This study tells within one long travels about 0.025 – 0.42% of the passengers infected with hepatitis B virus which is nearly similar to the whole magnitude of this study groups. In Israel between the years 1997 and 2012 a study was conducted to describe the epidemiology of acute viral hepatitis among travelers returning from tropical countries was conducted. Among 4,970 Israeli travelers two cases and one case were acquiring hepatitis B and C respectively [17]. From the above two articles, within one travel this much of infection was happened, even it would depend on personal activity that would expose for the infection.

In other part a cross-sectional study conducted in the Northern part of China with a result of 3.8% for HBV and 0.3 for HCV [19] which was higher than this study subjects. Some of the studies like, Retrospective study conducted in Belgium on registered data and the magnitude was 4.7% and 2.3% for HBV and HCV respectively [20], A cross-sectional study in Bangladish at Mymeningh City conducted and the magnitude was 14.8% and 6.9% for HBsAg and anti-HCV

Ab respectively [21], A systemic review and Meta-analysis on the magnitude of HBsAg in health care workers reviewed and reported as the magnitude of HBsAg in Sudan, Pakistan and Moroco were 16%, 4.7% and 1% respectively [22],A cross-sectional study conducted in Ruwanda showed3.9% of the participants were positive for HBsAg [20], and a cross-sectional study conductedin Cameron and 12.6% of the participants were positive for HBsAg [24], and a community based cross sectional study conducted in Addis Ababa Ethiopia which was 3.7% and 2.0% of HBV and HCV respectively[25]. Almost all the above mentioned studies were in higher magnitude than this study. The possible reason for this difference may be due to, their high KAP score a proper measure they take after occupationally exposed to infectious things and other personal behaviors.

The total participants of this study were 411; from those 401were females. This is because the activities of the job need more female and the rest 10 were males. Both two positive participants were female. Their educational status were, one with degree the other with diploma besides to cabin crew certification. They serve the Ethiopian airlines group one for eight (8) years the other for four (4) years. When we see their marital status one is married while the other is single. On this result it is not appropriate to discuss the magnitude of HBV among the study groups based on their socio-demographic characters.

Based on over all scoring of knowledge section 93.9 % of respondents had high level of knowledge, 1.5% of respondents had medium level of knowledge while only 4.6% of them had poor level of knowledge. Even though there is no similar study group previously done on it, this maximum knowledge score can support that the magnitude of HBV (0.49%) among study group. To indicate the figure that obtained from occupational risk group conducted in different parts of the world for instance medical workers Northern Vietnam health students, (74.6%) [25], Nigeria among medical students, 79.2%, on risks factors and mode of transmission of virus 74.9% whilst on prevention was 89% [29], In Egypt, among doctors and other health professionals98.4% of the students have heard about hepatitis C, and 95.6% of them know that it is prevalent in Egypt [30],In India, at private medical college Kochi (79.1%), of them has good knowledge [28], At Jimma University Medical Center among healthcare worker 73.9% and 60.9% had good overall knowledge about hepatitis B and hepatitis C viruses [33]. All the above mentioned groups

achieve fewer score except the study subject in Egypt. This difference was may be due to the difficulty of the questions or their level of knowledge difference.

In relation to attitude 97.3% (400/411) of the participants agreed/strongly agreed that HBV and HCV are the major health problem of the community. Only 0.73 %(3/411) disagree with this issue. The majority of the participants, 77.1% (317/411) have an attitude that they are occupationally exposed to the infection of hepatitis B and C virus. Ninety-eight percent (403/411) of the participants agree that wearing gloves is necessary practice during passenger care and lavatory cleaning. This study groups achieve more score than the study conducted in India, at private medical college Kochi, 84.3% of them with the right attitude towards hepatitis B infection [31],At Jimma University Medical Center among healthcare worker 88.7% of them had a positive attitude towards standard precautions [33]. This difference was may be due to the reasons already mentioned in knowledge parts.

Regarding to practice, even though 23.8% of participants were exposed to ill passengers' blood/body fluid, 99.5% of them applied standard precaution procedures, but only 20.2% of them screened and received complete vaccination dose of hepatitis B vaccine. According to a cross-sectional pilot survey by the European traveler health advisory board reports 68.7% of travelers not reported any protection against hepatitis B viruses [26], which was smaller than this study group.

This indicate that they are occupationally exposed for infection as a result the company continuing to supply proper personal protective equipment and update their awareness about infection prevention by providing refreshment courses periodically for all seniors and new employees.

9. Strength and limitation of the study

9.1. Strength

- It is the first study conducted in particular study subjects
- The study was done in a group assumed to be occupationally risk group
- Has high response rate (99.8%)

9.2. Limitation

- Only rapid serological test was done for all sero-negatives
- Un able to do viral load and other hepatitis B markers
- Only convenient sampling technique used, as a result sample proportion between male and female not maintained
- There was lack of similar literatures across the world and we forced to compare our findings with other studies

10. Conclusion and recommendations

10.1. Conclusion

According to world health organization categorization, magnitude of HBV and HCV < 2% considered to be Low region. Based on this study the magnitude of HBsAg among flying cabin crew of Ethiopian airlines group was 0.49% (2/411), for anti-HCV Ab 0.0% (0/412). Therefore, it can categorize as low magnitude. The hypothesis of this study was “there is no difference in the magnitude of hepatitis B and C virus among flying cabin crews of Ethiopian airline group compared to previous studies conducted in Ethiopia among other groups for HBV and HCV infection” But there is a difference in the magnitude of hepatitis B and C viruses. That means the null hypothesis is rejected. One of the reasons could be their record achievement of Knowledge, attitude and practice.

10.2. Recommendations

- it is better to vaccinate all flying cabin crew (only 20.2% are vaccinated)
- Even though they achieve high level of score on KAP, it is better to provide a basic or refreshment training course about blood or body fluid born infection, prevention, practice and control methods
- Large scale study including molecular methods needed to detect occult Hepatitis virus infection

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12. Annexes

I. Information Sheet of the study subject

Purpose: To assess the magnitude, KAP of HBV and HCV infections among Ethiopian airline group flying cabin crews.

Participation: Respectfully I am asking you to voluntarily participate in this study by responding some questions and allowing me to use the remaining sample that you already given for your physical checkup.

Risks: There are no risks associated with this study besides to taking the remaining blood sample. You allocate few minutes from their congested time frame to respond some questions prepared.

Benefits: If your status will be positive for HBV during investigation, result declared to you by company doctor when you discussed your final physical checkup result. As a result, get early follow up of your case based on your medical benefit provided by the company. If your status will be negative for HBV, you will take your result to get vaccine.

Confidentiality: Information that I collected from you during this study kept Confidentiality and your identity put away after re-coding your file and kept in a secured place. Only the principal investigators and your doctor able to link your identity with the code number, if this becomes necessary to assist you in any way

Sharing the result: At the end of the study we will present the result to responsible bodies, the report will not bear any information relevant to your personality and job. The confidentiality of such information hilly secured with the rule of medico legality.

Right to refuse: Anyone who has any suspicion since participation in this study is entirely voluntarily; you have a right of refusing to participate in this study at any time.

We were putting my address by saying; If you have any question regarding this study can be addressed to the principal investigator: Wasihun Sebesbe Gebretsadik (+251911025161)

Contact Address: Addis Ababa University, College of Health Sciences, Department of Medical Laboratory Sciences.

Cell Phone number: +251-911025161

E-mail:fantaye1982@gmail.com

II. Consent Forms of the study subject

I have been requested to participate in a research project that aims to assess the magnitude and KAP towards Hepatitis B and C viruses' infection among flying cabin crew of Ethiopian airline group. I have been informed that all information I gave the information kept confidentially. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way. I understand that participation in this study is completely voluntary. I am aware that the results of this Study will be used for scientific purposes and may be published. Agree to this, provided my privacy is guaranteed. And I confirm my agreement by putting my signature below. I hereby give my consent for using of my blood sample that I give for diagnosis/ my physical checkup for the renewal of my license.

Signature----------

Date----------

Address of the investigator

Name: Wasihun Sebesbe Gebretsadik

Address: Addis Ababa University, College of Health Sciences, Department of Medical Laboratory Sciences.

Email: fantaye1982@gmail.com

Cell phone number: +251911025161

III.Questionnaires

For the assessment of thesocio-demographic, associated risk factors and KAP of HBV and HCV infections in Addis Ababa Ethiopia at Ethiopian airline group flying cabin crews

Participant Code no: ☐☐☐☐

A. Socio-demographic and occupation of the participant

Circle your answers/ write on the space provided:

No	Question	Response Option
1.	Your age (write on the space provided)	
2.	Sex	1. Female 2. Male
3.	Your current marital status	1. Single 4. Divorced 2. Married 3.Widowed
4.	Your education level	1. Diploma 2. Degree 3. Masters 4. Graduated as a cabin crew 5. Others/specify_____
6.	For how long you are serving as a cabin crew after aviation academe graduation?	_____

B. The following questions are to assess your knowledge On Hepatitis B and C infection

Please Circle your answers

No	Question	Response Option	Remark
1.	Have you ever heard/read about hepatitis B and C	1. Yes 2. No	If your answer is No please don't go any further stop **here.**
2.	What is your source of information?	1. Aviation Academe 2. Social media 3. College/University 4. Friends	
3.	Can you get hepatitis B and C infection through sexual intercourse?	1. Yes. 2. No.	3. I don't know
4.	Can you get hepatitis B and C infection through blood contact?	1. Yes. 2. No.	3. I don't know
5.	Is body fluid can cause infection of hepatitis B and C?	1. Yes. 2. No.	3. I don't know
6.	Do Hepatitis B and c viruses transmitted through food?	1. Yes. 2. No.	3. I don't know
7.	Are hepatitis B and C viruses 'curable diseases?	1. Yes. 2. No.	3. I don't know
8.	Do hepatitis B and C can cause liver cancer?	1. Yes. 2. No.	3. I don't know
9.	Does HBV have vaccination?	1. Yes. 2. No.	
10.	How many doses of hepatitis B vaccine required for complete protection?	1. One times 2. Two times 3. Three times	

C. The following questions are to assess your level of attitude On Hepatitis B infection

Please use **x** mark to indicate your answers:

No	Indicate your level of agreement	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
1.	Hepatitis B virus is serious public health problem					
2.	You are at greater risk for hepatitis infection					
3.	It is necessaryforyoutoreceive hepatitis B vaccine					
4.	Hepatitis Bvaccine is safe					
5.	Afterexposureto body fluid vaccine reduces likelihood ofbeing Hepatitis B positive.					
6.	Training of Hepatitis Band C is important to booster your level of attitude about Hepatitis virus.					
7.	Hand washing isnecessary before and after service giving of the passengers.					
8.	Wearing gloves during collecting of used materials is unnecessary practice					
9.	After exposing to body fluids, Washing hands and using hand sanitizer can reduce the risk of Hepatitis B and C viruses infection					

D. The following questions are to assess your practice, related to exposure of hepatitis B and hepatitis C infection.

Please Circle your answers

No	Question	Response option
1.	Have you ever been exposed to blood and or body fluid of other person?	1) Yes 2) No
2.	Ifyes to theabovequestion what factor contributes tothe exposure?	1) Lack of infection prevention knowledge 2) Patient contact 3) Sharing sharp materials
3.	If yes for question number 1, what measure do you take?	1) Go to health institute 2) Consult friends 3) Wash with soap, water and antiseptic
4.	Have you ever been screened and received hepatitis B Vaccine?	1. Yes2. No
5	If you did not vaccinated what was the reason? (you can escape if vaccinated)	1) The vaccine is not easily available 2) Lack of information 3) Due to needle phobia 4) Too busy 5) Afraid of vaccines' side effect

6	Do you have a habit of washing hands before and after ill passenger care?	1. Yes2.No
7	Do you have a practice of washing hands and using hand sanitizer when unwanted contact with body fluids of passengers?	1. Yes 2. No
8	Do you have a practice of wearing gloves when you care your passengers (like during collecting of used cups and lunch/dinner boxes)?	1. Yes 2. No
9	How do you practice during inspecting or caring of aircraft lavatory on air?	1. By wearing gloves 2. On bare hand 3. Washing hand before and after inspection/caring 4. Other/Specify----------

IV. Laboratory Results format: for Rapid tests and ELISA test

Sample Code: ☐

1. HBs Ag Positive -	☐	Negative-	☐
2. Anti-HCV Ab Positive -	☐	Negative -	☐
3. ELISA HBV Positive -	☐	Negative -	☐
4. ELISA Anti-HCV Ab Positive	☐	Negative -	☐

Remark:

_____

_____

_____

_____

SOPs for Rapid tests

1. Take a time to wash your hands and wear gloves
2. Prepare the material required (needles, tubes, etc.)
3. Before sample collection introduce yourself and identify the patient
4. Prepare the patient
5. Apply the tourniquet (do not let it on for extended period)
6. Choose a vein
7. Disinfect the skin and wait until it drays and take a sample
8. Collect serum/plasma specimen in a clean test tubes.
    - Ensure that only sufficient quantity of the specimen is collected.
    - Exit the vein and apply pressure
    - Discard the needle (in appropriate biohazard container)
    - Label the specimen
    - Check the patient and apply a plaster if necessary
    - Allow the specimen for 15 to 30 minutes to facilitate clotting-
    - Centrifuge with medium speed for 10 minutes
    - Separate serum from the blood by Pasture pipette
    - Perform the lab test and store the remaining serum at -20c
9. Bring the sealed pouch to room temperature, open the pouch and remove the cassette

Once opened, the cassette must be used immediately or within 5 minutes.

10. Measure plasma/serum with pipette and dispense the sample in sample well.
11. The cassette should be left to horizon until the specimen flow evenly distributed.
12. At the end of the given time based on the manufacturer instruction read the result as follows:
    - NEGATIVE: Only one colored band appears on the cassette
    - POSITIVE: two distinct colored bands appear on the cassette.
13. The test should be considered invalid if no band appears. Repeat the test with a new cassette.
14. Although, depending on the concentration of HBsAg in the specimen, positive results may be start appearing as early as 2min, negative results must be confirmed only at the end of the given time.
15. In case of a doubtful result at final time, the test may be extended up to 30min to get a clear background.

VI.SOPs for direct ELISA

1. A micro titration well plate is coated with known antigen.

2. Add patent's serum. If the serum contains antibody it combine with antigen.

3. Wash carefully by using automatic washer more than 4 times.

4. Add enzyme labeled antihuman globulin, which attaches to the antibody.

5. Wash carefully.

6. Add the substrate, which is hydrolyzed (broken down) by the enzyme to give a color change.

7. Read the result.

Declaration

I, the undersigned agree to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the research publications office.

M.Sc. candidate: **Wasihun Sebesbe (B.Sc.)**

Signature: _____

Date of submission: _____

This thesis has been submitted with our approval as advisors.

Advisor: Kassu Desta, MSc, PhD fellow, Associate Professor of Medical Microbiology and Laboratory science

Signature: _____

Date: _____

Place: Addis Ababa, Ethiopia.

Advisor: **Dessie Abera (MSc)**

Signature: _____

Date: _____

Place: Addis Ababa, Ethiopia.