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Immunoassay Technique for Diagnosis of Hepatitis B and C Virus Among Drivers and Conductors of long Route Heavy Vehicles

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Abstract

It is reported from various studies that Drivers and Conductors of heavy vehicles are highly exposed to HCV and HBV. The present study is conducted to investigate the frequency and percentage of HCV and HBsAg in drivers and conductor's community of heavy vehicles in Pakistan. Data of about 200 subjects from District Bannu, Khyber-Pakhtunkhwa was collected for this study, in which 63% were drivers and 37% were conductors. They were screened for both HCV antibodies and HBsAg. The screening method used during the study was immunochromatographic technique (ICT), which showed that about 19.8% of the drivers were found to be HBsAg positive, while 5.5% were HCV positive. Also, 5.4% of the conductors were found to be HBsAg positive and 4.05% were HCV positive. This study revealed that chances of HCV and Hepatitis B is high in unmarried drivers and conductor as compared to married one. Also, the present study concluded the maximum prevalence of Hepatitis B and C in persons of age 35-45.

Keywords: Frequency, Hepatitis B, HCV, Immune chromatographic technique, Screening, Prevalence

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1. INTRODUCTION

Hepatitis is the cause of acute and chronic inflammation and infection of the liver which also gives rise to major health related problems across the world. There are different types of hepatitis, but the most commonly cause of death and end-stage illness is Hepatitis "B" and "C". It is estimated that 78 % cases of liver cancer and 57 % of cases of liver cirrhosis are the result of Hepatitis B and C virus infections [1,2].

Hepatitis B virus is a double stranded DNA virus, a specie of orthohepadnavirus genus and a member of Hepadnaviridae. Human are known to be only the natural host for hepatitis B virus [3]. HBV get entry to the liver through blood stream and replicates itself in liver tissues only. The intact virus infection is from 42-47

nm in a diameter and circulates in the blood streams at a concentration of 108 virions per ml. This virus has partially double stranded DNA, containing 3,200 – nucleotide molecules, and a DNA polymerase with reverse transcriptase activity. Hepatitis B surface antigen (HBsAg) is existing on each surfaces of the virus as a self-assembling, tubular or spherical non-infectious particles [4,5]. Chronic infection with hepatitis B virus affects nearly 240 million people globally, and they also increase the danger of emerging cirrhosis, hepatocellular carcinoma and fibrosis [6]. The risk of Hepatocellular carcinoma is highest in the patient of hepatitis B virus of Asians and African origins [7]. Nowadays, Hepatitis B virus (HBV) is becoming a foremost health issue in many developing countries as well as Pakistan. Pakistan occurs in a category of highly endemic country (round about 9 million people are infections all over the country) and with 3% chronic HBV carrier, which rate of infection is increasing day by day [8,9]. HBV is transmitted through various ways including blood transfusion, reuse of contaminated syringes, other close contacts e.g. sexual contact etc [10–12]. The reason of transmission in all this procedures and methods is because of poor adaptation of hygienic conditions and preventive measurements [13]. Hepatitis B symptoms includes high fever of 38◦C, body pains, less appetite, diarrhoea, yellowness of the skin and eyes (jaundice), dark urine, pale and grey-coloured stool [14].

Hepatitis C virus (HCV) is enveloped virus which is small about 55—65 nm in size, contain single – stranded RNA and are placed in the family of Flaviviridae. Around 185 million people are infected with HCV throughout the globe [15], while about 399000 people are dying every year from Hepatitis C, usually from cirrhosis of liver and hepatocellular carcinoma (HCC) [16]. The prevalence of hepatitis C virus infection is different considerably around the world, the maximum infectious rate is in Central Asia, which is about (3.8%), in East Asia about (3.7%), while in the region of Middle East and North Africa about (3.6%) [17,18]. In China the accurate and exact prevalence of HCV is not determined yet but ranging from 0.43 to 3.2% [19,20]. Pakistan is among one of the lower middle economic countries in which about 7.0 million chronic infection had occurred in 2013) [18] . The percentage prevalence found for all the provinces of Pakistan in which Punjab was 5.46%, Baluchistan 25.77%, Sind 2.55 %, KPK (Khyber Pakhtunkhwa) 6. 07 % and FATA (Federally Administrated Tribal Area) was 3.37% [21].

Hepatitis C virus mainly spread through blood and other bodily fluids (genital secretion, cerebrospinal fluid, amniotic, peritoneal and pleural fluid). In Low middle economic countries, it seems as health- care related exposures, e.g. during blood transfusion, middle stick injuries, as well as use of intravenous drugs are the utmost common mode of HCV transmission [22]. Transfer from mother to child with HIV is approximately 11% in women and without HIV is 6% in women [23]. Although there is minor evidence of heterosexual transmission, potential HCV transmission occurs in men having sexual relationship with other homosexual individuals [24,25].

Early symptoms of HCV includes a high fever of 38 °C or even above, less appetite, abdominal pains, tiredness, muscle and joint aches. Advanced symptoms includes indigestion, certain mental disorder such as lack of attention, short-term memory, anxiety and depression [14,26].

The aim of the study was to investigate frequency and percentage of HCV and HBsAg in drivers and conductor's community of long routes heavy vehicles in Pakistan.

2. MATERIALS AND METHODS

2.1 Study setting

This analytical study was conducted at Basheer medical laboratory District Bannu, Pakistan. Basheer medical lab is a standard lab in district Bannu, where all the routine and some special chemistry test are performed.

2.2 Sample Size and Time Period of Study

A total of 200 samples were conventionally collected from unknown drivers and conductors. The whole data were collected in about 3 months, from March 2018 to May 2018, out of which 115 samples were taken from drivers and remaining 85 were from conductors. All the samples were analyzed against HBsAg and HCV antibodies.

2.3 Sample Collection

All the 200 samples were collected from large vehicles drivers and conductors. These samples were collected from different large vehicles stands. During sample collection the blood was collected from cubital fossa vein. After that blood was dropped in gel tube. The WHO (World Health Organization) recommended protocol was used for sample collection [27,28].

2.4 Sample Processing

The collected samples were centrifuged in Basher medical laboratory, at 5000 revolution for 10 minutes in order to collect the serum. After collecting the serum, a less expensive and easily accessible method known as immune chromatographic technique (ICT) was used for detecting HBs Ag and HCV. The protocol followed was already used by [29,30].

3. RESULTS AND DISCUSSIONS

3.1 HBs Ag+ and Anti HCV+ cases

The study comprises of 200 subjects from district Bannu in which 126 (63%) drivers and 74 (37%) conductors were participated. Among 126 drivers, 25 (19.8%) were found to be HBs Ag positive, while 7 (5.5%) were HCV positive. Among the conductors, 4 (5.4%) were determined to be HBs Ag positive and 3 (4.05%) were HCV positive. Out of 200 participants, 29 (14.5%) were HBsAg and 10 (5%) were HCV positive (Fig. 1).

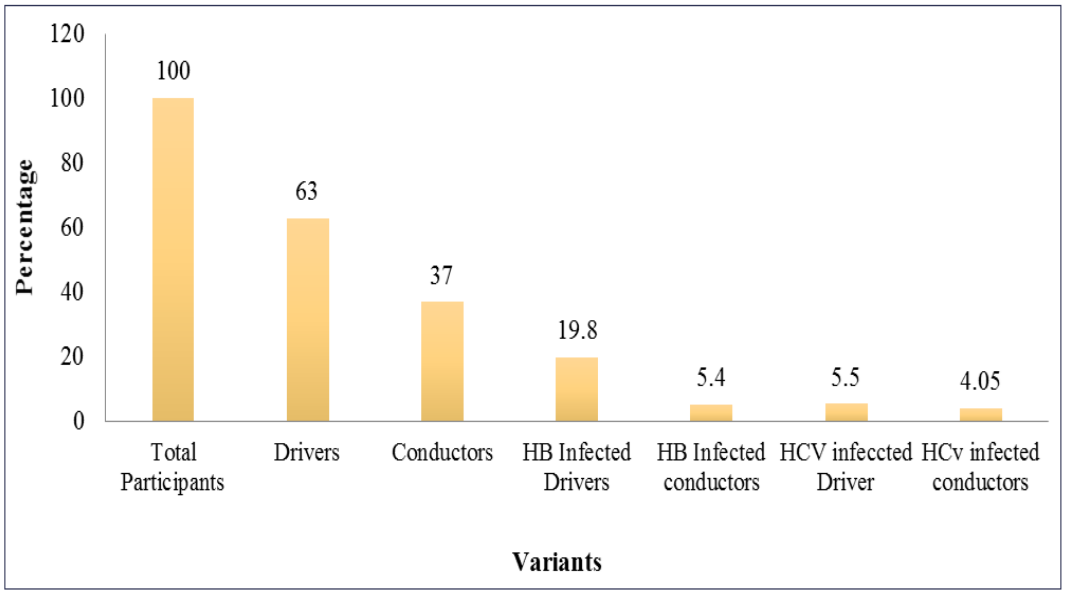

Fig. 1 HBsAg+ and Anti HCV+ Cases

3.2 Prevalence on the base of marital status

Out of 126 drivers, 10 (7.9%) were unmarried in which 2 (20%) were HBsAg positive and 3 (30%) HCV positive. Married drivers of heavy vehicles were 116 (92%), in which positive cases of HBsAg and HCV were 23 (19%) and 4 (3.4%) respectively (Fig. 2 (a)).

In case of conductors, 19 (25.69%) were unmarried and 55 (74 %) have been found to be married. Among unmarried conductors, 3 (15.7%) were HBsAg positive, while 2 (10.5%) were HCV positive. The frequency of HBsAg and HCV when analyzed, was about 1 (1.8%) in both cases of married conductors. The below table and graphs show that unmarried positive persons are at high risk for their families (Fig. 2 (b)).

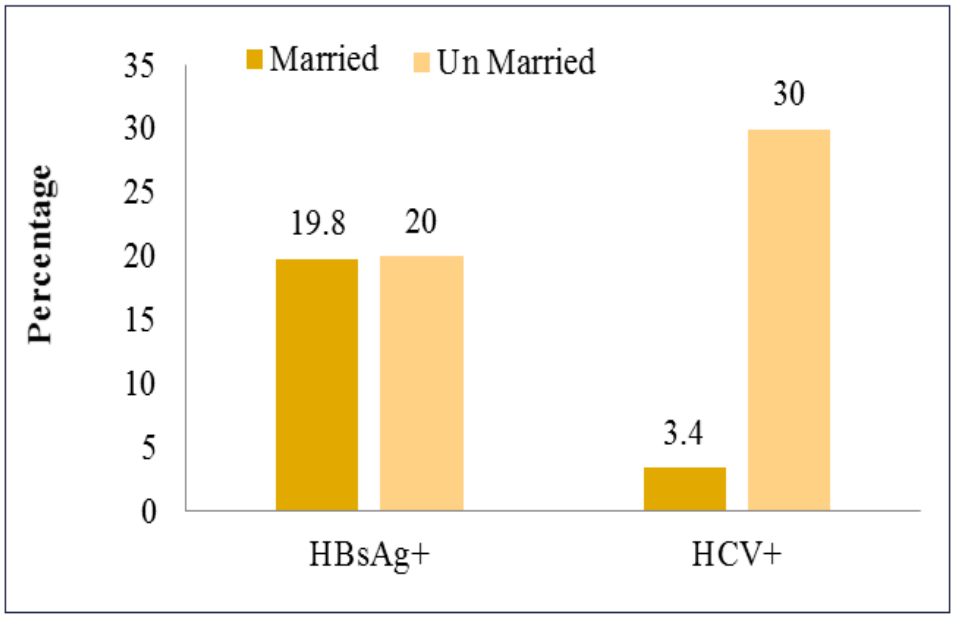

Fig. 2 (a). HBsAg and HCV+ Married and Un Married Drivers

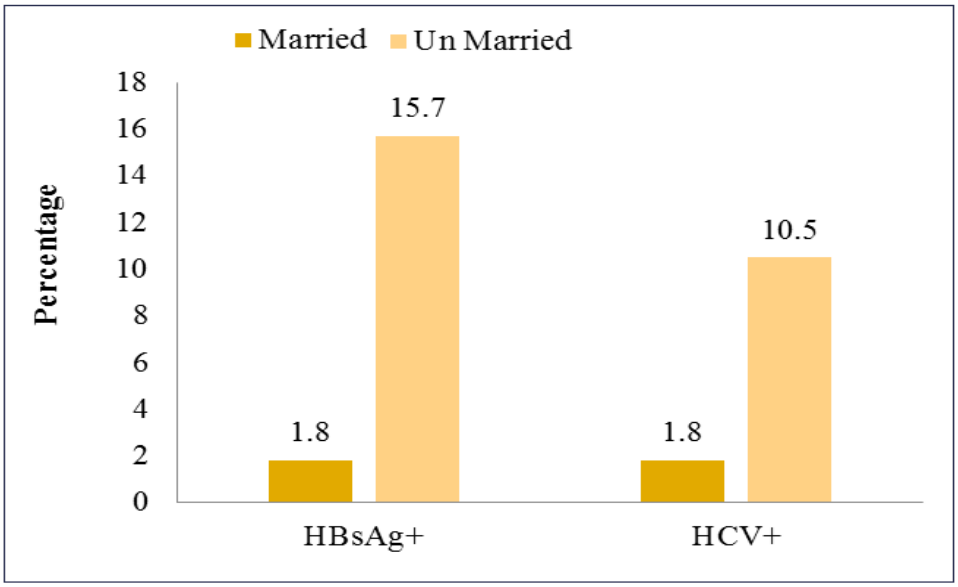

Fig. 2 (b). HBsAg and HCV+ Married and Un Married Conductors

3.3 Prevalence on the base of Age

The average ages of the participants were 32, in which the maximum age was 65 years while the minimum was 15 years. The maximum prevalence of HBsAg positive was found to be occurred in the participants of age between 55 to 65 years. The minimum prevalence was observed between the ages of 15 to 25 years. In case of HCV the maximum participants who are considered positive are among the age of 35 to 45, while no case was present above 45 years (Fig. 3).

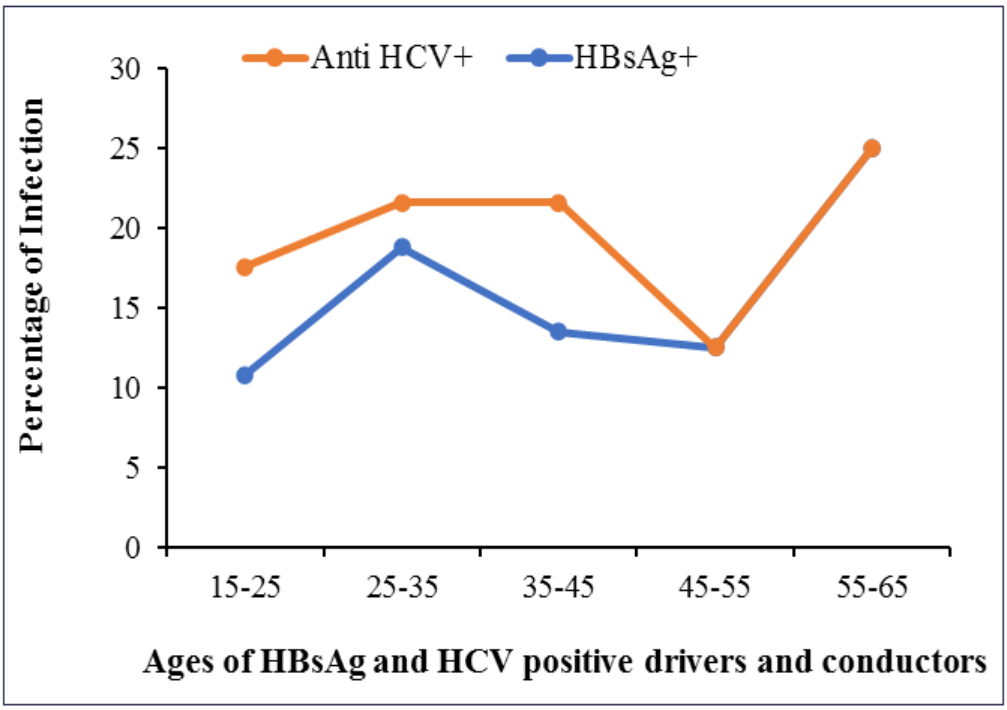

Fig. 3. HBsAg and HCV+ cases on the base of Age

3.4 Prevalence on the base of sexual contact

Sixty-four (32%) of the participants of the present study have been admitted because of having sexual contact with partners other than their wives, in which 53 (26%) were drivers and 11 (5.8%) were conductors. In those participants 12 (18.75%) were HBsAg positive and 2 (3.125%) were HCV positive, in which mostly were on sexual contact without condoms, homosexual contact and sex with multiple partners. Table 3 shows the summary of the sexual contact of heavy vehicles drivers and conductors in district Bannu, Khyber-Pakhtunkhwa.

Table 1. Data of HBsAg+ and Anti HCV+

Participants	Number	Percentage	HBs Ag+ (%)	Anti HCV+ (%)
Drivers	126	63%	25 (19.8 %)	7 (5.5%)
Conductors	74	37%	4 (5.4%)	3 (4.05%)
Total Participants	200		29 (14.5%)	10 (5%)

Table 2. HBsAg+ and HCV+ data on the bases of marital status

Samples	Un Married			Married		
	Numbers	HBsAg + (%)	Anti ab HCV (%)	Numbers	HBsAg + (%)	Anti ab HCV (%)
Drivers	10	2 (20%)	3 (30%)	116	23 (19.8%)	4 (3.4%)
Conductors	19	3 (15.7%)	2 (10.5%)	55	1 (1.8%)	1 (1.8%)
Total samples (200)	29	5 (17.2%)	5 (17.2%)	171	24 (14.03%)	5 (2.92%)

Table 3. Showing the prevalence of HCV infection in drivers and conductors on the base of age. The maximum prevalence was 3 (8.1%), among the age of 35 to 45 years, while the minimum prevalence of 2 (2.8%) were seen in the age of 25 to 45

Age	Drivers	Conductors	HBs Ag+ (%)	Anti HCV+ (%)
15-25	38 (19%)	36 (18%)	8 (10.8%)	5 (6.75%)
25-35	45 (22.5%)	24 (12%)	13 (18.8%)	2 (2.8%)
35-45	30 (15%)	7 (3.5%)	5 (13.5%)	3 (8.1%)
45-55	11 (5.5%)	5 (2.5%)	2 (12.5%)	Nil
55-65	2 (1.0%)	2 (1.0%)	1 (25%)	Nil
Total Samples (200)	126 (63%)	74 (37%)	29 (14.5%)	10 (5%)

Table 4. HBsAg and HCV+ cases on the bases of sexual contact

Samples	Sexual contact (%)	NO Condom use (%)	Sex with multiple partners (%)	Homo sexual contact (%)	Sex with female only (%)	HBsAg +	Anti Ab HCV +
Drivers	53 (26%)	17(32.07%)	9 (16.98%)	23 (43.3%)	13 (24.5%)	9 (16.9%)	2 (3.75)
Conductors	11 (5.5%)	3 (27%)	5 (45%)	2 (18.18%)	3(27.2%)	3(27.2%)	Nil
Total samples (200)	64 (32%)	20 (31.25)	14 (21.87%)	25 (39.06%)	16 (25%)	12(18.75%)	2(3.125%)

The present study was conducted in the examination of HBsAg in a long route of heavy vehicle's drivers and conductors in district Bannu KPK, Pakistan. It provides information regarding HBsAg and HCV in drivers and conductors of our country. The prevalence of HBsAg in heavy vehicles drivers were (19.8%) and in conductors were (5.5%). According to previous study on the same idea, there is no data present on the conductors of heavy vehicles; therefore, we cannot compare it with the conductors of other countries. On the other hand, some data are present on the driver's community in other countries of the world as well. According to study reported, the prevalence of HBsAg in drivers in different countries are (18.9%) in Brazil, (5.1%) in India, (5.9%) in Bangladesh and (6.1%) in Iran. The prevalence of HBsAg in Brazil is comparatively equal to the study in Pakistan, but its ratio highly increases in comparison to the other above explained countries.

Truck drivers and conductors live apart from their families for long period of time. As most of the drivers (92%) and conductors (74%) are married, therefore, for the fulfilment of their sexual desire they seek other partner for keeping sexual contact. Also, the truck drivers and conductors keep sexual contact with multiple partners like sex with homosexual, sex with females other than wives; hence they are not taking any precautionary and safety measures. Due to ethical and religious problem it was difficult for us to investigate the whole participants about the sexual contact history. Out of 200 samples only 64 (32%) gives us sexual contact history in which drivers were 53 (26%) and conductors were 11 (5.5%). In this data the frequency of homosexual contact was very high. Among them the one using no contraceptives were (31.25%), those having sex with multiple partners were about (21.87%) and those having sex with females were (25%). The prevalence of HBS Ag in drivers and conductors according to sexual contact was respectively (16.9%) and (27.2%).

When the frequency of Anti HCV antibodies in the drivers and conductors of large vehicles in district Bannu was studied, the prevalence was about 5.5% in drivers, while it was about 4.05% in conductors. The whole prevalence of HCV antibodies in drivers and conductors were 5%. When the prevalence of HCV in

drivers in the present study was compared with Brazilians drivers it was 5.5%, which is comparatively high. Based on marital status, the prevalence of HCV infections in unmarried drivers was 30%, while it was 10.5% in conductors, which indicated that the HCV infection is high in unmarried drivers. Respectively in the married drivers and conductors, the prevalence of HCV infection was 3.4% and 1.8%.

4. CONCLUSIONS

The finding of this study concluded the prevalence of HBsAg and Anti HCV ab in heavy vehicles drivers and conductors, showing the high frequency of HBsAg and HCV ab cases. Also, by various comparisons the current study shows that drivers and conductors are at high risk for Hepatitis B and C.

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CONFLICT OF INTEREST

All authors declare no conflict of interest regarding this article.

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