SEROPREVALENCE OF HIV, HCV AND HBs Ag IN POLICE PERSONNEL

Training Report

Internship Training Report

Submitted to

Lovely Professional University, Punjab

in partial fulfillment of the requirements

For the degree of

Master of Science in Clinical Microbiology

Submitted by:

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(Reg No. 11403271)

SCHOOL OF PHYSIOTHERAPY AND PARAMEDICAL SCIENCES

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DECLARATION

I hereby declare that the work embodied in this internship report was carried by me under the supervision of Mr. Shaminder Singh (Internal supervisor), Lovely Professional University and Dr. Kailash Chand and Dr. Priyanka Khanna (External Supervisors). This work has not been submitted in part or in full in any other university for any degree or diploma.

Name: Baltej Singh

Date: ……

Place: ……..

CERTIFICATE

This is to certify that **Mr. Baltej Singh** bearing **Registration Number 11403271** has completed his Master of Science in Clinical Microbiology internship under our guidance and supervision. This report is record of the candidate own work carried out by him under my supervision. I certify that the matter embodied in this report is original and has been not submitted anywhere for the reward of any other degree.

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ABSTRACT

The study was conducted at PIMS (Punjab Institute of Paramedical sciences) at Jalandhar from January 2016 to April 2016. In the present study, we have screened 2500 police personnel, in which 2220 (88.8%) were males and 280 (11.2%) were females. According to age distribution, the maximum personnel i.e. 1870 (74.8%) belonged to the age group of 21-30 years followed by 31-40 years (12%), 41-50 years (9%) and >50 years (3.4%) .

Out of total 2500 personnel, prevalence of HIV reactive was found to be 0.4%, HCV reactive was found to be 1.16% and HBs Ag was 0.5%. The study revealed that in HIV reactive cases 10 were males and only 1 case of female. 22 males and 7 females were found to be reactive in HCV and in HBs Ag there were 7 males and only 1 was female.

In our study, we found that the prevalence of HIV and HCV was more predominant in females (0.71% and 2.5%) as compared to males (0.45% and 0.99%).

The prevalence of HBs Ag in females was slightly more than (0.35% in females) as compared to males (0.31%).

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Msc. Clinical Microbiology

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Chapter:-1

INTRODUCTION

Police personnel, who are usually first responders to any casualty, have the potential for occupational exposure to blood, which increases their risk for blood-borne infections such as HIV (Human Immunodeficiency Virus), HCV (Hepatitis C Virus) and HBV or HBs Ag (Hepatitis B Virus) etc. Therefore a higher prevalence might be seen in this group as compared to the general population.

Regular monitoring of the information in the form of annual examination on high-risk behaviours and prevalence in this group is still strongly recommended.

HIV is a RNA virus, if left untreated, can cause acquired immune-deficiency syndrome (AIDS). Because of the advancements in treatment and testing, it is rare that HIV progress to AIDS if identified in advance. AIDS is the terminal stage of HIV infection. Blood is an important part of the body's immune system. White blood cells help protect from disease process. Certain white blood cells called T cells perform a crucial role. Some of the T cells are "helper" cells that signal other cells for needful. The virus replicates and can attack the infection-fighting T-cells of the body's immune system. When enough cells are destroyed, the immune system no longer works and the patient develops AIDS.

First confirmed case of AIDS was identified in 1983 and by 1984 the etiologic agent, the Human Immunodeficiency Virus (HIV), subsequently named HIV-1 was isolated. Shortly afterwards in 1985 another retrovirus subsequently named HIV-2 was isolated in Africa. These two viruses belong to the retrovirus group and are slow viruses.

HIV/AIDS has had a great impact on society, both as an illness and as a source of discrimination. The disease also has large economic impacts. There are many misconceptions about HIV/AIDS such as the belief that it can be transmitted by casual non-sexual contact.

There is no cure or vaccine available as on date, however, antiretroviral treatment can slow the course of the disease and may lead to a near-normal life expectancy. Treatment is recommended as soon as the diagnosis is made. Without treatment, the average survival time after infection may be around 10 years.

Hepatitis C Virus (HCV) was identified in 1989 as the main aetiological agent of non-A, non-B hepatitis (NANBH) accounting for greater than 90% of post-transfusion hepatitis cases. Hepatitis C Virus (HCV) is a flavi virus which belongs to Flaviviridae family. It is now the commonest cause of post-transfusion hepatitis in the various developed countries. Hepatitis C is an infection that mostly affects the liver. Often, a person with Hepatitis C does not have

any symptoms. However, chronic infection can scar the liver. Many years of infection may cause cirrhosis. Sometimes, people with cirrhosis also have liver failure or liver cancer. They can also have very swollen veins of the oesophagus and stomach. The blood loss from this problem can kill. Around the world, about 130–170 million people have Hepatitis C. Scientists began studying the Hepatitis C virus in the 1970s, and in 1989 they proved that the virus exists. As far as scientists know, this virus does not cause disease in any animals other than humans.

The medications that are normally used to treat Hepatitis C are called peg interferon and ribavirin. Between 50-80% of people who are treated (5 to 8 out of every 10) are cured. However, if a person's Hepatitis C has progressed (or gotten worse) so much that the person has cirrhosis or liver cancer, the person might need a liver transplant. This makes it possible for the person to survive, but the Hepatitis C virus usually comes back after the transplant. There is no vaccine that works to prevent people from getting Hepatitis C.

Hepatitis B virus (HBV) is a member of the hepadnavirus family. HBs Ag (also known as the Australia antigen) is the surface antigen of the hepatitis B virus (HBV). It indicates current hepatitis B infection. This is because it was first isolated by the American research physician and Nobel Prize winner Baruch S. Blumberg in the serum of an Australian Aboriginal person. It was discovered to be part of the virus that caused serum hepatitis by virologist Alfred Prince in 1968. The infection can be diagnosed 30 to 60 days after exposure. Diagnosis is typically by testing the blood for parts of the virus and for antibodies against the virus. It is one of five known hepatitis viruses i.e. A, B, C, D, and E.

Risk factors of HIV, HCV and HBsAg infections

Sharing drug needles or syringes.

Sexual contact (including oral, anal or vaginal sex) with someone who is HIV, HCV and HBs Ag positive or whose HIV,HCV and HBs Ag status is unknown, without the protection of a latex condom.

Having another sexually transmitted disease such as syphilis, herpes, chlamydial infection, gonorrhoea or bacterial vaginosis seems to increase the risk of being infected by HIV,HCV and HBs Ag during unprotected sexual contact with an infected partner.

Babies can be infected by the mother (positive case) during pregnancy or breast feeding.

The person may be of any status, rich or poor, young or old, black or white, gay or straight, married or single, it's what person do, not who person is, that puts a person at risk.

Sign and Symptoms of the infection

Many people have no symptoms of any of these infections; symptoms are usually vague to start with such as flu-like symptoms a month or two after getting these viral infections. Others may include fever, headache, tiredness, and enlarged reticuloendothelial organs. Further symptomatology depends upon the stage of the disease.

Chapter: - 2

Terminology

HIV: - Human Immunodeficiency Virus (HIV) is a lentivirus (a member of the retrovirus family) that cause acquired immunodeficiency syndrome (AIDS), a condition in humans in which the immune system begins to fail, leading to life-threatening opportunistic infections, infection with HIV occurs by the transfer of blood, semen, vaginal fluid, pre-ejaculate, or breast milk. Within these bodily fluids, HIV is present as both free virus particles and virus within infected immune cells. HIV is estimated to be 9 to 11 years, depending on the HIV subtype.

HCV: - Hepatitis C is an infectious disease affecting the liver, caused by the hepatitis C virus (HCV). The infection is often asymptomatic, but once established, chronic infection can progress to scarring of the liver (fibrosis), and advanced scarring (cirrhosis) which is generally apparent after many years.Over many years however, it often leads to liver disease and occasionally cirrhosis. In some cases, those with cirrhosis will develop complications such as liver failure, liver cancer, or esophageal and gastric varices.

HBsAg: - Hepatitis B is an infectious disease caused by the hepatitis B virus (HBV) which affects the liver. It can cause both acute and chronic infections. Many people have no symptoms during the initial infection. Some develop arapid onset of sickness with vomiting, yellowish skin,tiredness, dark urine and abdominal pain. Often these symptoms last a few weeks and rarely does the initial infection result in death.Sign and symptoms may take 30 to 180 days for symptoms to begin. In those who get infected around the time of birth 90% develop chronic hepatitis B while less than 10% of those infected after the age of five do.

Gonorrhoea: - Is a sexually transmitted infection. The usual symptoms in men are a burning sensation with urination and discharge from the penis. If it left untreated, may cause inflammation of the epididymis or pelvic inflammatory.

Syphilis: - Is also sexually transmitted infection. Sign and symptoms of this are vary depending in which of the four stages it presents (Primary, Secondary, Latent and Tertiary). In first stage, the skin ulceration will be there.

Chapter:-3

Aims& Objectives

The aim and objective of the study is to evaluate the prevalence of various viral diseases, usually transmitted through sexual route/ body fluids in the blood samples of serving police personnel in Punjab during their annual medical examinations.

Chapter:-4

Review of Literature

There have been large numbers of studies conducted by various workers to find out the seroprevalence in blood of various viral diseases transmitted sexually or by various types of body fluids amongst healthy individuals in blood donors, pregnant women or incidentally found during medical examination of armed forces or police personnel. A few studies included all the prevalent infections i.e. HIV, HCV and HBs Ag while other included in various combinations such as HIV and HCV only or HCV and HBs Ag.

In a cross-sectional study (1) undertaken in 1987 to establish whether New Zealand police and customs officers are at excess risk of hepatitis B virus infection as a consequence of occupational exposure to human blood and penetrating injury. The study population comprised all full-time police (n = 5,193) and customs officers (n = 1,026) excluding only a small number on special duty who had already been immunized. The control group comprised the civilians employed by both organizations (n = 964). The prevalence of hepatitis B markers in the control group, when standardized for age, sex, and ethnic distribution, was 13.4%, which agrees well with New Zealand blood donor figures. The prevalence ratios for police officers and customs officers compared with the civilians (adjusted for age, sex, and ethnic distributions) were 0.82 (95%) and 0.49 (95%), respectively.

The study done in 1998 about the seroprevalence of HBV, HCV & HIV, and Co-Infection in Tripoli, conducted by Mohamed A. Daw et.al (2). Serum samples were collected from 9170 individuals enrolled from the nine districts of Tripoliin 1998. The male-to-female (M:F) ratio was (7500 males, 81.8%; 1670 females, 18.2%). The ages of the participants ranged from 16 to 72 years, with a mean of 34±16.30 years. The serum samples were analysed for HBs Ag, anti-HCV and anti-HIV antibodies. Of the 9170 samples, 438 (4.9%) were singly positive for HBs Ag, anti-HCV or anti-HIV. The overall prevalence of HBV was 3.7%. The prevalence of HBV was 1.4 times higher among males. The overall prevalence of HCV was 0.9%.The prevalence rates of HIV was (0.4%).This is higher than that of HCV/HBV, HBV/HIV, and HBV/HCV/HIV co-infections (3,4) which were 4 (0.04%), 3 (0.03%) and 2 (0.02%) respectively.

Another similar study conducted by Garg DK (3) from June, 1994 to May, 1999 was conducted at Zonal Blood Transfusion Centre, Umaid Hospital and SN Medical College, Jodhpur, India. Donors were evaluated for seroprevalence of HIV, HBV, HCV and Syphilis. A total of 46,957 donors were tested, out of which 42,291 (90.1%) were replacement donors

and 4666 (9.0%) were voluntary donors. The incidence of HIV was 0.44% in total donors, more in replacement (0.461%) as compare to voluntary (0.279%). The seroprevalence of HBV in total donor was 3.44%. The replacement donors had high incidence (3.52%) as compared to voluntary donors (2.57%). The incidence of HCV seropositivity was 0.285% (5 month data), all were replacement donors (0.328%). The seroprevalence of VDRL in total donor was 0.22%, more in replacement donor (0.239%) as compare to voluntary donors (0.129%).

Another study undertaken in 2000 on seroprevalence of Hepatitis B, C and HIV in Blood Donors in Northern Pakistan' conducted by N. Salamat et.al. (4). Healthy donors were selected from both Armed Forces and civilian population, were tested by Enzyme Linked Immunoassay at Armed Forces Institute of Transfusion Rawalpindi. Of 103858 blood donors, 3.3% (95%) were HBs Ag, 4.0% (95%) were anti HCV and 0.007% anti HIV positive. Their average age was 28 years. HBs Ag positive donors were a decade younger than anti HCV positive donors.

A study (5) on Prevalence of hepatitis-B surface antigen among blood donors and human immunodeficiency virus-infected patients in Jos in Nigeria were conducted by PU Inyama et al. in 2005. Hepatitis-B surface antigen (HBs Ag) ELISA was used to determine the prevalence of HBs Ag among 175 blood donors (aged 20-40 years) and 490 HIV-infected patients (aged 17-60 years) in Jos, Nigeria. Twenty-five (14.3%) of the blood donors and 127 (25.9%) of the HIV-infected individuals were HBs Ag seropositive, indicating a higher HBV infection among HIV-infected persons than among healthy blood donors. A slightly higher HBs Ag seroprevalence was recorded in the males (14.6%) than females (12.9%) of the blood donors. Among the HIV-infected patients, the males had considerably higher HBs Ag seroprevalence than the females (31.8 vs 22.1%) with the highest prevalence of HBsAg occurring in the 51-60 years age group (44%), followed by those of 31-40 years (28.2%).

SangeetaPahujaet.al. (6) conducted a study in 2005 in which a total of 28,956 healthy blood donors took 28,805 replacement donors (99.48%) and 151 (0.52%) voluntary donors. The proportion of voluntary donors was significantly low ($P < 0.001$) where males formed the bulk of the donor population (97.24%). The prevalence of HCV, HIV and HBs Ag was 0.66% (ranging from 1.01% in 2002 to 0.29% in 2005), 0.56% (ranging from 0.70% in 2002 to 0.44% in 2005) and 2.23% (ranging from 2.42% in 2002 to 1.97% in 2005), respectively.

Al-Ajlan conducted this study (7) in which total number males and females students was 9852 and 6718 taken respectively in 2007. The mean age of male students was 21.1 years and of females was 21.3 years. The students were divided into 2 age groups: 18–21 years and 22–30 years. There were 6268 (63.6%) male and 4486 (66.8%) female students in the18–21-year-old age group, and 3584 (36.4%) male and 2232 (33.2%) female students in the 22–30-year-old age group. Among males and females, 0.17% and 0.78% respectively were HBsAg-positive in the 18–21-year-old age groups, while 0.39% and 0.90% respectively were HBs Ag-positive in the 22–30 year-old age group. The proportion of anti-HCV positive cases was higher in the older age group of 22–30 years.

Hepatitis B and C Viral Infections among Blood Donors from Rural Ghana, a study conducted by B Nkrumah et. al. (8), a total of 2773 prospective blood donors was screened from January 2006 to December 2008. Out of this, 2556 (92.2%) were males and 217 (7.8%) were females. Majority of the study population, 1217 (43.9%) were in the 26 to 35 age group. Of the total number, 10.53% (292/2773), 5.63% (156/2773) and 2.09% (58/2773) were HBV, HCV and both HBV and HCV positive respectively. The overall prevalence rate for HBV was highest in 2006 (13.8%) but decreased in 2008 to 6.9%. However, the overall prevalence of HCV was highest in 2007 (11.1%) but decreased to 7.0% in 2008. The prevalence rate of HBV was relatively higher in females but vice versa for HCV.

In a study conducted byP. Pallaviet.al. (9) on the blood donors for four years period between 2004 and 2008 at JSS Hospital, Mysore. A total of 39,060 healthy adult donors were screened during the study period. Among them 38,215 (97.84%) were males and 845 (2.16%) were females. 25,303 (64.78%) were voluntary donors while 13,757 (35.22%) were replacement donors screened for HIV, HCV, HBsAg and syphilis and malaria revealed the overall prevalence of HIV, HCV,Hbs Ag and syphilis were 0.44, 1.27, 0.23 and 0.28%, respectively.

Bisseye C conducted a study (10) in which the total of 4,520 blood donors in 2009, 1,348 (29.82%) were infected with at least one pathogen and 149 (3.30%) had serological evidence of multiple infections. The overall seroprevalence rate of HIV, HBV, HCV and syphilis was 2.21%, 14.96%, 8.69% and 3.96%, respectively. Among blood donors with multiples infections, the most common dual or triple combinations were HBs Ag-HCV (1.39%), HBs Ag-syphilis (0.66%) and HBs Ag-HCV-syphilis (0.11%). The highest prevalence's of HBs

Ag and HIV were found among blood donors from rural areas and in the age groups of 20-29 years and >40 years old, respectively.

Seroprevalence of HIV, hepatitis B and C viruses and syphilis among blood donors in Koudougou (Burkina Faso) in 2009, a study was conducted by Sanou M. (11). From the total of 4,520 blood donors in 2009, 1,348 (29.82%) were infected with at least one pathogen and 149 (3.30%) had serological evidence of multiple infections. The overall seroprevalence rate of HIV, HBV, HCV and syphilis was 2.21%, 14.96%, 8.69% and 3.96%, respectively. Among blood donors with multiples infections, the most common dual or triple combinations were HBs Ag-HCV (1.39%), HBs Ag-syphilis (0.66%) and HBs Ag-HCV-syphilis (0.11%). The highest prevalence of HBs Ag and HIV were found among blood donors from rural areas and in the age groups of 20-29 years and >40 years old, respectively.

The study (12) which was conducted by Horvat RT, of seroprevalence of HIV, HBV, HCV and syphilis was found to be 0.154%, 0.887%, 0.101%and 0.22% respectively in 2009, in voluntary blood donors as against the figures of 0.179, 1.16%, 0.123 and 0.26% being the seroprevalence of HIV, HBV, HCV and syphilis in replacement blood donors. It is clear that seroprevalence of HIV, HBV, HCV and syphilis in replacement blood donors is higher than that in voluntary blood donors which is an expected finding.

A study was conducted by Dr. Arora et. Al (13) to find out the seroprevalence of HIV, HCV and HBs Ag in blood donors in southern Haryana in 2010. It was over 3 years retrospective study conducted at the blood transfusion centre of Maharaja Agrasen Medical College, Agroha (Hisar). Donors were screened for seroprevalence of HIV, HBV, HCV and syphilis. A total of 5849 donors were tested, out of which 4010 (68.6%) were replacement donors and 1839 (31.4%) were voluntary donors. The seroprevalence of HIV was 0.3% in the donors. No voluntary donor was found to be positive for HIV. The low sero-positivity among donors is attributed to pre-donation counselling in donor selection. The seroprevalence of HCV, HBV and syphilis was 1.7%, 1.0% and 0.9% respectively in total donors. The seroprevalence of hepatitis and syphilis was more in replacement donors as compared to voluntary donors.

In another study, (14) Seroprevalence of HBV and HCV in blood donors' which was conducted by B.R. Tiwari et al in Nepal in 2010, a total of 5,351 donors were screened in whom 84.8% (4,537/5,351) were males and 15.2% (814/5,351) were females. Among them 47 donors were found seropositive for HBV giving the seroprevalence of 0.87% (47/5,351).

The HBV seroprevalence in male donors was 0.96% (44/4,537) and in female donors was 0.36% (3/814). The seroprevalence of HCV was found 0.26% all of whom were males (14/5,351). In the same study in a place Kaski (Pokhara), a total of 5,995 blood donors were screened in whom 87.5% (5,245/5,995) were males and 12.5% (750/5,995) were females. Among them 21 donors were found to be seropositive for HBV giving the seroprevalence of 0.35% (21/5,995) of whom 20 were males and only a single seropositive donor was female. The seroprevalence of HCV was 0.16% (10/5,995) of whom 8 were males and 2 were females. Another place in Banke (Nepalgunj) Blood Transfusion Service, a total of 5,211 donors was screened in whom 91.5% (4,766/5,211) were males and 8.5% were females. Among them 63 were found to be seropositive for HBV giving the seroprevalence of 1.20% (63/5,211) of whom 62 were males and only 1 was female. The seroprevalence of HCV was 0.11% (6/5211), of whom all were males.

Another study conducted by Frank Emmrich (15) in 2010, in which the total of 6361 consecutive blood donors, 607 (9.5%) had serological evidence of infection with at least one pathogen and 50 (0.8%) had multiple infections. The overall seroprevalence of HIV, HBV, HCV and syphilis was 3.8%, 4.7%, 0.7%, and 1.3% respectively. Among those with multiple infections, the most common combinations were HIV - syphilis 19 (38%) and HIV - HBV 17 (34%). The seropositivity of HIV was significantly increased among female blood donors, first time donors, housewives, merchants, soldiers, drivers and construction workers. Significantly increased HBV seropositivity was observed among farmers, first time donors and age groups of 26 - 35 and 36 - 45 years.

A survey conducted by A.S. Bakarey et.al. (16) in 2010 on 624 blood donors from a teaching hospital in the south western part of Nigeria and some privately owned blood banks. The samples were tested for the presence of HBsAg and anti-HCV using a qualitative technique based on the principle of antigen-antibody reaction. Results show that seroprevalence of hepatitis B surface antigen, antibodies to hepatitis C virus and co-infection of HBV/HCV in the tested subjects were 13.5, 3.0 and 1.1% respectively.

In a similar study conducted by PK Datta et.al. (17) on seroprevalence of Hepatitis B, Hepatitis C, and HIV among healthy voluntary first-time blood donors in 2010 in Kolkata, a total of 3745 voluntary first-time blood donors were studied. Among them, majority, 3406 (90.95%), were male and only 339 were female (9.05%). Among the three viruses, prevalence wise, HBV outnumbered the other two. Prevalence of HBV was 1.55%, whereas

HCV and HIV were 0.35% and 0.32%, respectively. The study population was divided into four groups according to their age and found that most of the male donors were within 18 to 29 years age group, whereas maximum female donors were within 30 to 39 years age group.

The study regarding the seroprevalence of HIV and HBV was conducted by AO Ayilara (18) on 236 military (235 male and 1 female) personnel in Nigeria in 2014. 41 (17.4%) and 27 (11.4%) were positive for HIV and HBsAg, respectively. HBV/HIV co-infection was found only among 2 (0.85%). The highest prevalence of HIV and HBV were within the age bracket of 35-46: 19.6% for HIV and 22.4% for HBV; and the least prevalence of 0% was seen in the age group of 56 and above. 41 (17.4%) men and 0 (0%) female were positive for HIV; while 27 (11.4%) male and 0 (0%) female were positive for HBV.

B. Kishan Rao (19) in his study on seroprevalence of HIV, Hepatitis B & C viruses in healthy voluntary blood donors of college going students (16 – 25 years) at Khammam in 2014, A.P found that out of the total 237 blood donors 189 (79.7%) were males and 48(20.3%) were females. HBsAg was positive in 4 (1.68%) of the blood donors (1 male and 2 females of group 21-25 years and 1 male of 16-20 years). HCV was positive in 2 (0.84%) and the two were males (1 from each group). HIV was positive in 1 (0.42%) male donor of age group 21-25 years.

A study was conducted on (20) Prevalence of hepatitis B and C viruses' infection among military personnel at Bahir Dar Armed Forces General Hospital, Ethiopia by Birku T et.al.in 2015. The study revealed that the sero-prevalence of HBV and HCV infection were 4.2 and 0.2%, respectively. None of the study subjects were co-infected with HBV and HCV. Higher prevalence of HBV infection (11.3%) was observed in the age group of 40 and above.

Chapter:-5

Material and Methods

The current study was conducted in Microbiology department of Punjab Institute of Medical Sciences, Jalandhar during the period of 1st January 2016 to 25th March 2016. Blood samples of 2500 police personnel were taken. Sera was separated and screened for HIV, HCV and HBs Ag by rapid test method.

HIV

The TriDot test is manufactured by J. Mitra& Sons of India, and was developed specifically for the Indian market. The test is named for the three dots that appear to give the result: one pink dot is a control dot, showing the test is functioning properly; one dot shows the presence of HIV-1 antibodies and one dot shows the presence of HIV-2 antibodies.

HIV TRI-DOT kit was used to test the antibodies detection against HIV-1 and HIV2 in serum samples of the healthy serving police personnel. This is a rapid Visual Test for the Qualitative detection of Antibodies to HIV-1 & HIV-2 in Human Serum/Plasma.

Principle of HIV test

HIV antigens are immobilized on a porous immunofilteration membrane. Sample and reagents pass through the membrane and are absorbed into the underlying absorbent.

As the patient's sample passes through the membrane, HIV antibodies, if present, bind to the immobilized antigens.

Conjugate binds to the Fc portion of the HIV antibodies to give distinct pinkish purple DOT(s) against a white background.

Procedure

1. 3 drops of Buffer Solution were added to the centre of the device.

2. Dropper was held vertically and add 1 drop of patient's sample (serum or plasma) using the sample dropper provided (use a separate sample dropper for each specimen to be tested).

3. 5 drops of Buffer Solution were added again.

4. 2 drops of Protein-A Conjugate added directly from the conjugate vial.

5. 5 drops of Buffer Solution addedand readresult

HCV

For the detection of Hepatitis C Virus, we used HCV TRI-DOT (Rapid Visual Test for the Qualitative Detection of Antibodies to HEPATITIS C Virus in Human Serum/Plasma.

Principle

HCV antigens are immobilized on a porous immunofiltration membrane and are absorbed into the underlying absorbent pad.

As the patient's sample passes through the membrane, HCV antibodies if present in serum/plasma, bind to the immobilized antigens. In the subsequent washing step, unbound serum/plasma proteins are removed.

In the next step, the protein-A conjugate is added which binds to the Fc portion of the HCV antibodies to give distinct pinkish purple dot against a white background at the test region.

Storage of Kit

Store the kit at 2-8oC in the driest area available. The shelf life of the kit is 15 months from the date of manufacturing.

Do not use the kit beyond the expiry date mentioned on it .

Procedure of HCV TRI-DOT is also same as HIV TRI- DOT, but Buffer Solution and Conjugate of both are differ from each other.

HBs Ag

For the detection of hepatitis B virus, we prefer to HEPACARD.

One Step Rapid Visual Test for the Qualitative Detection of HBs Ag in Human Serum/Plasma.

Principle

HEPACARD is a one step immunoassay based on the antigen capture, or "sandwich" principle. The method uses monoclonal antibodies conjugated to colloidal gold and polyclonal antibodies immobilized on a nitrocellulose strip in a thin line. The test sample is introduced to and flows laterally through an absorbent pad where it mixes with the signal reagent. If the sample contains HBsAg, the colloidal gold-antibody conjugate binds to the antigen, forming an antigen-antibody- colloidal gold complex. The complex then migrates through the nitrocellulose strip by capillary action. When the complex meets the line of immobilized antibody (Test line) "T", the complex is trapped forming an antibody-antigen-colloidal gold complex. This form a pink band indicating the sample is reactive for HBs Ag. To serve as a procedural control, an additional line of anti-mouse antibody (Control line) ‘C’, has been immobilized at a distance from the test line on the strip. If the test is performed correctly, this will result in the formation of a pink band upon contact with the conjugate.

Procedure

1. Required number of HEPACARD foil pouches and specimen were brought to room temperature prior to testing.

2. Took out HEPACARD device from the foil pouch.

3. Test card was labelled with patient's name or identification number.

4. 2 drops (70ul) of human serum/plasma specimen added into the sample well using the dropper provided (use separate dropper/micro tip for each specimen).

5. Reaction was allowed to occur during the next 20 minutes.

6. Read results at 20 minutes.

7. HEPACARD was discarded immediately after reading result at 20 minutes, considering it to be potentially infectious.

INTERPRETATION OF RESULTS

Non Reactive Result

Appearance of only one dot at the control region "C" indicates that the sample is NON-REACTIVE for antibodies to HCV.

Invalid Result

If no dot appears after the completion of test, either with clear background or with complete pinkish/purplish background the test indicates ERROR.

In case of ERROR, the specimen should be retested on a fresh device.

Chapter:-6

Result and Discussion

During the entire training period i.e. from**1st January** to **30th April** at PIMS (Punjab Institute of Medical Sciences) Hospital, Jalandhar, the clinical specimens were obtained from the in-service police personnel at Jalandhar. A total of **2500** samples have been processed. Out of these**2220** were from male and **280**from the female policepersonnel**(Table:-1).** The age and gender wise distribution of the police personnel have been shown in the table 1 and figure 1 below, clearly showing

Gender	No. of police personnel	%age
Male	2220	88.8
Female	280	11.2
Total	2500	100

Table 1. Showing total

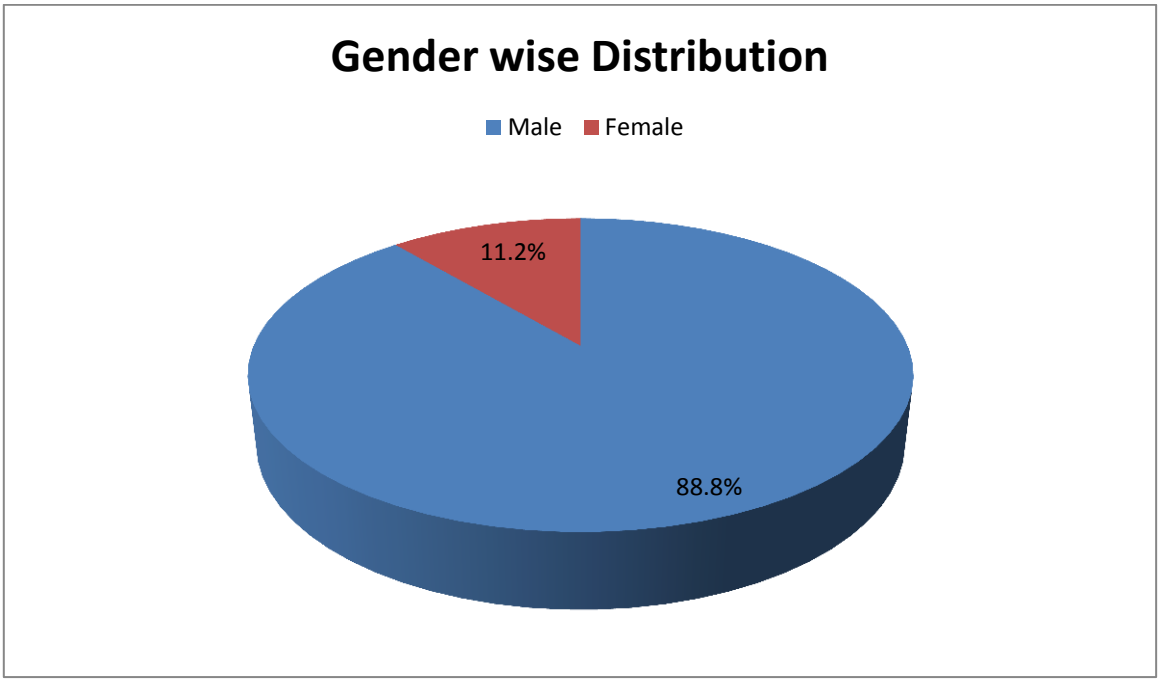

Figure 1. Showing gender wise distribution (Males were found to be 88.8% as against 11.2% female personnel)

Age group	No.	%age
21 – 30	1870	74.8%
31 – 40	315	12.6%
41 – 50	230	9.2%
>50	85	3.4%
Total	2500	100%

Table 2. Showing the percentage of police personnel according to age group.

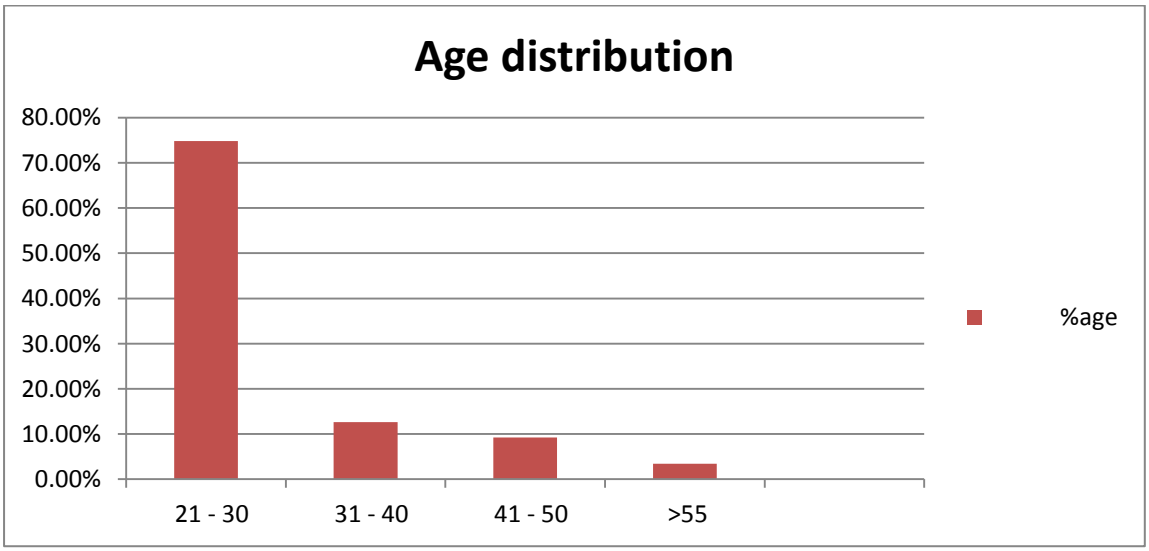

Figure 2. Most of the personnel belonged to age group 21-30 years (75%).

	HIV	%age
Reactive	11	0.4
Non-Reactive	2489	99.6
Total	2500	100

Table 3. Showing the prevalence of HIV.

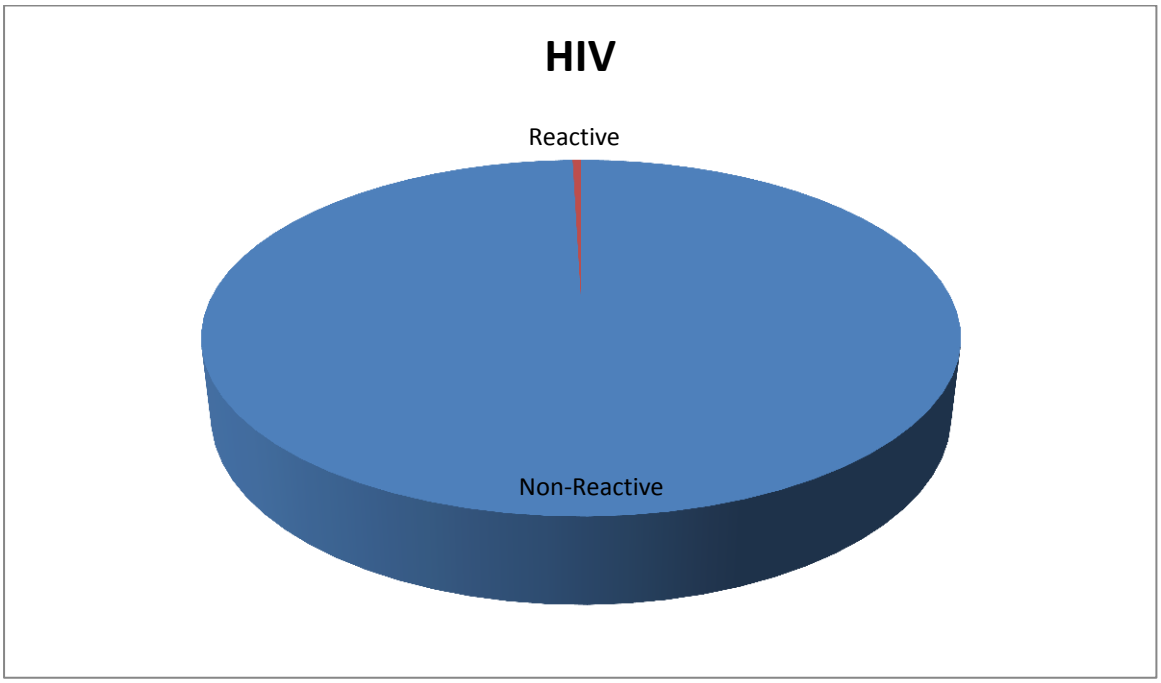

Figure 3. Showing that the prevalence of HIV reactive is 0.4% in police personnel.

	HCV	%age
Reactive	29	1.16
Non-Reactive	2471	98.84
Total	2500	100

Table 4. Showing the prevalence of HCV.

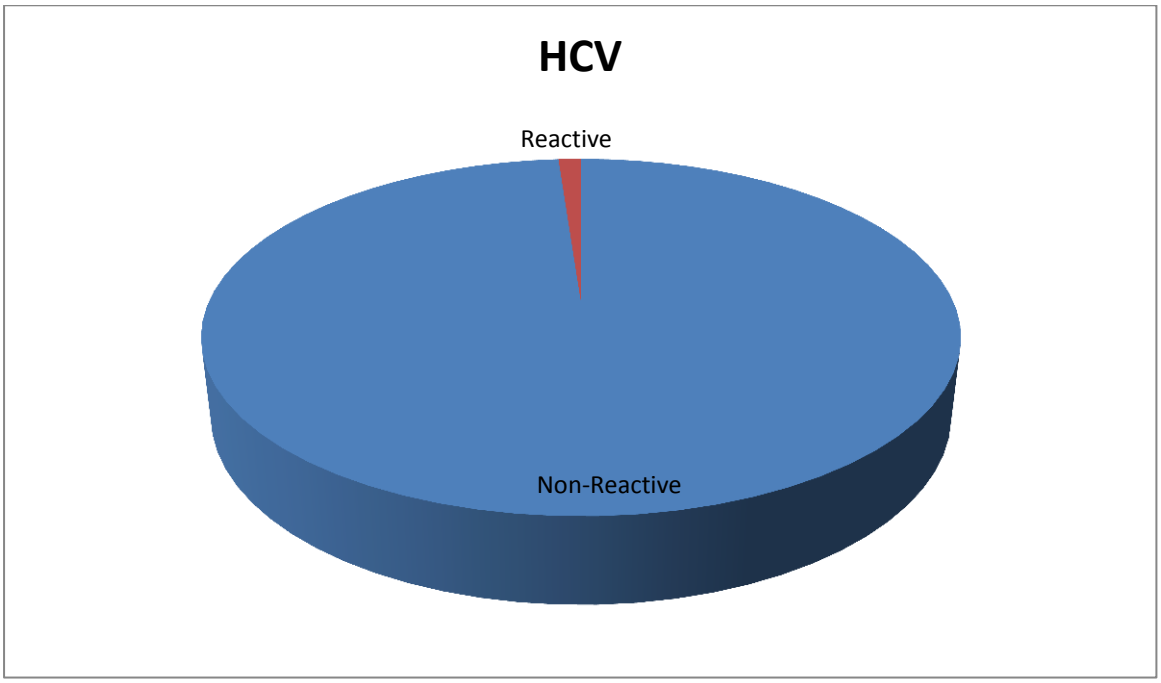

Figure4. Showing that1.16% of the personnel were HCV Reactive.

	HBs Ag	%age
Reactive	12	0.5
Non-Reactive	2488	99.5
Total	2500	100

Table 5. Showing the prevalence of HBs Ag.

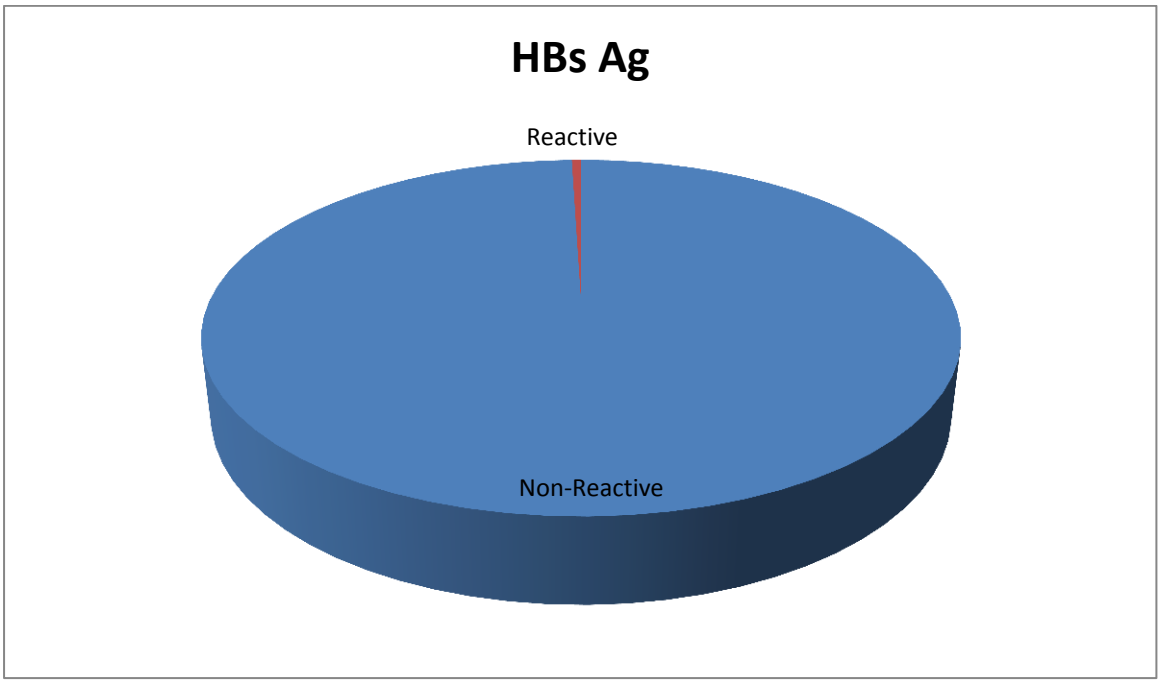

Figure 5. Showing that 0.5% of the personnel are HBs Ag reactive.

	HIV+HCV	HCV+HBs Ag	HIV+HBs Ag
No.	2	0	0
%age	0.08%	0	0

Table 6. Showing the concurrent infection of only HIV with HCV was found in 2 out of 2500 personnel. No incidence of any other concurrent infection.

Gender	Reactive (%age)
Male(n=2220)	10 (0.45%)
Female(n=280)	1(0.71%)

Table 7. Showing the gender distribution of HIV positive cases.

Gender	Reactive (%age)
Male(n=2220)	22 (0.99%)
Female(n=280)	7 (2.5%)

Table 8. Showing the gender distribution of HCV positive cases.

Gender	Reactive	(%age)
Male(n=2220)	7	(0.31%)
Female(n=280)	1	(0.35%)

Table 9. Showing the gender distribution of HBs Ag positive cases.

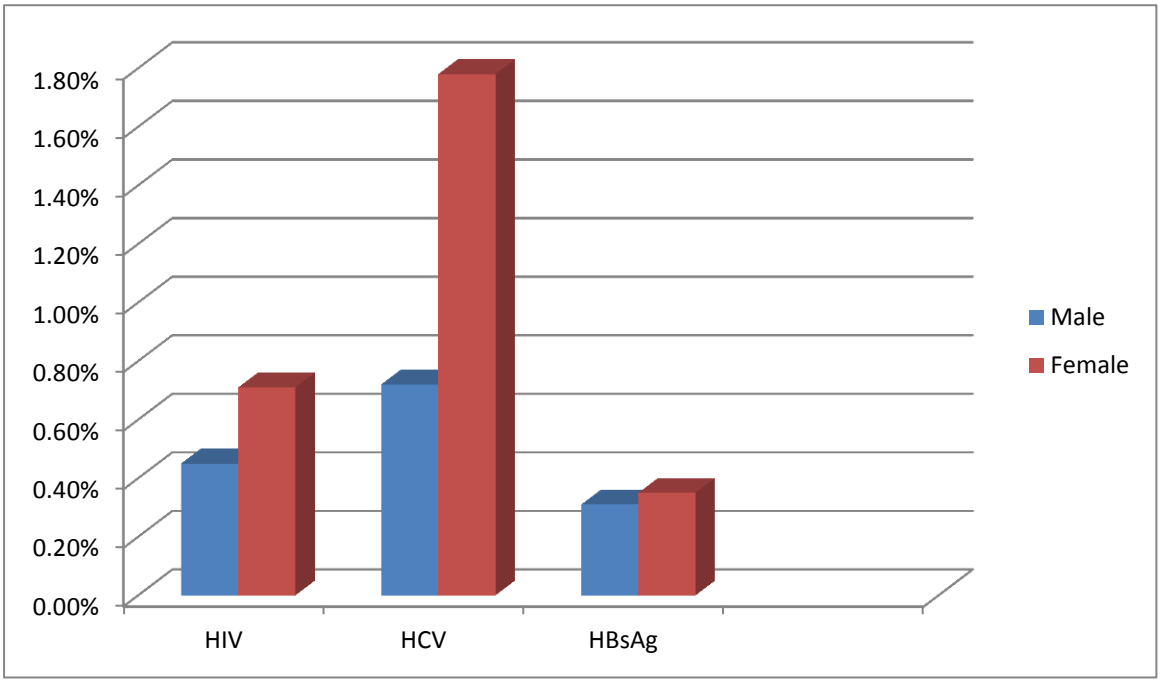

Figure 6. The bar graph represents the positive cases of HIV, HCV and HBs Ag.

Discussion

Sero-epidemiological studies on HBV, HCV and HIV are an important step in formulating preventive strategies. The prevalence rates of these infections vary according to the risk factors involved, socioeconomic status, and initial burden of infectious markers in the community, which vary from one country to another and even between different regions within the same country. With every unit of blood, there is1% chance of transfusion associated problems including TTI. The risk of TTI has declined dramatically in high income nations over the past two decades, but the same may not hold good for the developing countries. The national policy for blood transfusion services in our country is of recent origin and the transfusion services are hospital based and fragmented.

Our study has aimed at determining the seroprevalence of HBV, HCV and HIV among Police personnel because they are usually the first responders to any casualty, have the potential for occupational exposure to blood, which increases their risk for blood-borne infections such as HIV, Hepatitis C and Hepatitis B etc. Therefore a higher prevalence might be seen in this group as compared to the general population.

In the present study, we have screened 2500 police personnel, in which 2220 (88.8%) were males and 280 (11.2%) were females [Table 1]. According to age distribution, the maximum personnel i.e. 1870 (74.8%) belonged to the age group of 21-30 years followed by 31-40 years (12%), 41-50 years (9%) and >50 years (3.4%) [Table II].

Out of total 2500 personnel, prevalence of HIV reactive was found to be 0.4% (11), HCV reactive was found to be 1.16% (29) and HBs Ag was 0.5% (12).

The study conducted by Kapuret al. (21) at Delhi in 8 years period revealed the overall HIV seroprevalence of 0.68%, which was slightly higher than our incidence (0.4%). The seroprevalence of HBs Ag was 1.2% in the same study.

Sarin et.al. (22) at New Delhi conducted a study in which the seroprevalence of HIV was 0.5% and on other side the same study was conducted by Joshi et.al. (23) Where the seroprevalence of HIV was 0.47%. Both of the study correlated with our study in which the HIV seroprevalence is 0.4%.

A similar study conducted by Kulkarni et.al. (24) at Bombay, Ramanamma et.al. (25) at Vishakapatnam and Shashikala et al. (26) at North Karnataka observed HIV seroprevalence was 1.3%, 5.06% and 1.74% respectively. The incidence of HIV was much higher as compared to our incidence (0.4%).

Allain Pierre Jean et al. (27) conducted a study in which the seroprevalence of HCV was 0.28%. Desphandeet al. (28) observed the similar study in which the seroprevalence of HCV Was 0.35%, which is less than the current study.

Various studies in India about the seroprevalence of HCV have shown data ranging from the lowest (0.31%) in the study by Bhattacharya et al in 2007 to the higher one of 1.09% (Gupta et al, 2004).

India has been placed in the intermediate zone of prevalence of hepatitis B by the World Health Organization (2–7% prevalence rates) with a HBs Ag prevalence rate of 1–2% reported by Lodha et.al (29). Supporting this, HBsAg prevalence in Punjab blood donors was 1.7% (30), while Rajasthan had 3.44% (31) and Delhi had 2.23% (29). In Karnataka, coastal area (32) had 0.62% and Bangalore (33) had 1.86% of HBV seropositivity. Our study revealed the prevalence of HBsAg as 0.5% which is similar to study done at Karnataka.

B. Kishan Rao conducted a study on seroprevalence of HIV, Hepatitis B & C viruses in healthy voluntary blood donors of college going students (16 – 25 years) in 2014, A.P. The study revealed 79.7% were males and 20.3% were females. HBs Ag was positive in 1.68%, HCV was positive in 0.84% (near about 1%) HIV was positive 0.42%. These findings are in agreement with our present study. In our study prevalence of HBs Ag, HCV and HIV was 0.5%, 1.16% and 0.4% respectively. So this study is in correlation with our study according the distribution of gender wise also where maximum incidence of positive cases was found to be in age group 21-25years.

The study conducted by P. Pallavi et.al. on the blood donors for four years period between 2004 and 2008 at JSS Hospital, Mysore also revealed the similar results showing prevalence

of HIV, HCV and HBs Ag of 0.44%, 1.27% and 0.23% respectively which is strongly same as our study.

A study was conducted by Dr. Arora et. al to find out the seroprevalence of HIV, HCV and HBs Ag in blood donors in southern Haryana at the blood transfusion centre of Maharaja Agrasen Medical College, Agroha (Hisar) in 2010.. The seroprevalence of HIV, HCV and HBs Ag was found to be 0.3%, 1.7% and 1.0% respectively in total donors and in our study the prevalence of HIV, HCV and HBV is 0.4%, 1.16% and 0.5% respectively.

In a similar study conducted by PK Datta on seroprevalence of Hepatitis B, Hepatitis C, and HIV among healthy voluntary first-time blood donors in Kolkata which is in correlation with our study, a total of 3745 voluntary first-time blood donors were studied. Among the three viruses, prevalence wise, HBV outnumbered the other two. Prevalence of HBV was 1.55%, whereas HCV and HIV were 0.35% and 0.32%, respectively. In our study no such increased incidence of HBV was found. The study population was divided into four groups according to their age and found that most of the donors were within 18 to 29 years age group correlating with our study where the most of the personnel were within 21 to 30 years age group.

A study about Hepatitis B and C Viral Infections among Blood Donors from Rural Ghana, conducted by B Nkrumah et. al. a total of 2773 prospective blood donors were screened from January 2006 to December 2008. Out of this 92.2% were males and 7.8% were females. Majority of the study population 43.9% were in the 26 to 35 age group of the total number. The seroprevalence of HBV, HCV and both (HBV+HCV) was 10.53%, 5.63% and 2.09% positive respectively. The seroprevalence of this study was higher than our study which can be attributed to rural background and the poor socioeconomic status of this country. In our study the seroprevalence of HBV is 0.5%, HCV 1.16% and there was no case was found of concurrent HBV&HCV. Concurrent infection of only HIV with HCV was found in 2 out of 2500 personnel in the present study. No incidence of any other concurrent infection. This is not in correlation with the study of B Nkrumah mainly because of the above said reason.

Analysis of sex-related seroprevalence showed that the females were relatively more infected than the males. Althoughthe difference was only slight among the police personnel and no statistically significant difference was observed. A study showing similar results of greater

incidence in females was conducted by A. Al-Ajlan (7) where a significantly greater proportion of female students were positive in both age groups and for both markers of HBs Ag and anti-HCV compared to males. This difference can be attributed to the lesser number of females screened as compared to the males. Thus although the reactive cases were higher in males, the overall percentage showed that female personnel are more vulnerable to these infections. This is in contrast to the findings of Su et al. (34).

Chapter:-7

Conclusion

Our study revealed intermediate prevalence of the viral infections in police personnel with slightly greater prevalence of HCV. This study encourages regular screening of Police personnel for the detection of the viral markers like the health care workers as they are also vulnerable to contracting these infections.We recommend total healthcare screening and medical management of all police personnel. In addition, proper information and technique should be taught to police personnel for handling causalities especially management of infectious material like blood as they are the first responders to mishaps.

Chapter:- 8

BIBLIOGRAPHY

1. Brunton, C, Kemp, R., Raynel, P., Harte, D, & Baker, M. (2000). Cumulativeincidence of hepatitis C. NZ Med J, 113, 98-101

Burt, R., Hagan, H., Garfein, R., Sabin, K., Weinbaum, C., &Thiede, H. (2007). Trends in Hepatitis B Virus, Hepatitis CVirus, and Human Immunodeficiency Virus Prevalence, Risk Behaviours, and preventive Measures Aged 18-30 Years, 1994-2004. J Urban Health, 84(3), 436 – 454

2. Mohamad A. Daw et.al. seroprevalence of HBV,HCV and HIV co-infection and risk factors analysis in Tripoli-Libya;1998;plos one

3. Soniagarg, Dr Mathur, DK Garg, Department of pathology & Medicine, Dr. SN Medical Collage, Jodhpur, Rajasthan. Indian J. Pathol.Microbiol:40(4):409-412, 2001.

4. M.F. Khattak,N. Salamat,F.ABhatti,T.Z. Qureshi**(** Armed Forces Institute of Transfusion, Rawaplindi. **)** Seroprevalence of Hepatitis B, C and HIV in Blood Donors in Northern Pakistan
Mujeeb SA, AmtulHafeez. Prevalence and pattern of HIV infection in Karachi. J. Pak. Med.Assoc., 1993; 43:2-4..

5. Egesie Julie and Egesie Gideon University of JosNigeria

Abdalla F, Mwanda OW, Rana F (2005). Comparing walk-in and call-responsive donors in a national and a private hospital in Nairobi.East African Medical Journal. 82(10):532-536.

6. SangeetaPahuja, Meenal Sharma, BuddhanBaitha and Manjula Jain, Department of Pathology, Lady Hardinge Medical Collage, New Delhi, India. Jpn. J. Infect. Dis., 60, 389-391, 2007

7. Riyadh College of Health Sciences (Men), King saud University, Saudi Arabia (Correspondence to A-R. Al-Ajlan):EMHJ, Vol. 17 No. 10, 2011

Eastern Mediterranean Health Journal La Revue de Santé de la Méditerranéeorientale

Al-Faleh FZ. Changing pattern of hepatitis viral infection in 4.Saudi Arabia in the last two decades.Annals of Saudi Medicine, 2003, 23:367–371.

8. B. NKRUMAH1, M. OWUSU2, H. O. FREMPONG3 and P. AVERU3
1Kumasi Centre for Collaborative Research in Tropical Medicine, Kumasi, Ghana, 2Komfo Anokye TeachingHospital, Kumasi, Ghana, 3Agogo Presbyterian Hospital, Agogo, Ghana. Vol.45, No.3, Sept.2011

9. Jobarteh M, Malfroy M, Peterson I, Jeng A, Sarge-Njie R, et al. (2010) Seroprevalence of hepatitis B and C virus in HIV-1 and HIV-2 infected Gambians. Virol J 7: 230–239. doi: 10.1186/1743-422x-7-230

10. Collenberg E, Ouedraogo T, Ganame J, et al. Seroprevalence of six different viruses among pregnant women and blood donors in rural and urban Burkina Faso: a comparative analysis. J Med Virol.2006;78:683–92.

11. Marius Bolni Nagalo2,3, Mahamoudou Sanou1, Cyrille Bisseye2, MarilèneInès Kaboré1, Yacouba K. Nebie1, Kisito Kienou1, Alice Kiba1, Honorine Dahourou1, Siaka Ouattara1, Jean Didier Zongo3, Jacques Simporé2
Seroprevalence of human immunodeficiency virus, hepatitis B and C viruses and syphilis among blood donors in Koudougou (Burkina Faso) in 2009

National Blood Transfusion Centre (CNTS), Ouagadougou; 2"Pietro Annigoni" Biomolecular Research Centre (CERBA), Ouagadougou;3 Biotechnology and Genetics Laboratory, University of Ouagadougou; Burkina Faso

12. Horvat RT, Tegtmeier GE. Hepatitis B and D Viruses. In: Murray PR, Baron EJ, Jorgensen JH, Pfaller M, Yolken RH, editors. Manual of Clinical Microbiology, 8th ed, Vol 2. Washington DC, ASM Press; 2003.

13. Dimple Arora, Bharti Arora1, AnshulKhetarpalDepartments of Pathology and 1Microbiology, Maharaja Agrasen Medical College, Agroha-125047 (Hisar) Haryana, India. Dr. Dimple Arora, Department of Pathology, Maharaja Agrasen Medical College, Agroha-125 047, (Hisar) Haryana, India.

14. Schreiber GB, Busch MP, Kleinman SH, Korelitz JJ. The risk of transfusion-transmitted viral infections. N Engl J Med 1996;334:1685-90

Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures: A review. J Viral Hepat 2004,11:97-107

.

15. Opaleye O, Zakariyahu T, Tijani B, Bakarey A. HBV, HCV co-infection among blood donors in Nigeria. Indian J PatholMicrobiol. 2010;53:182-3

Mabayoje V.O., Fadiora S.O. Akinwusi P.O., Adeyeba O.A., Muhibi M.A. Egbewale B.E. Seroprevalence of hepatitis B and C among health care workers in a tertiary health institution in South West, Nigeria. Afr J. ClinExpBiol 2005; 7: 6569.

16. Department of Medical Microbiology, Faculty of Clinical Medicine, College of Health Sciences, Ebonyi State University, PMB 053, Abakaliki, Nigeria

Bhatti FA, Ullah Z, Salamat N, Ayub M, Ghani E (2007).
Anti-hepatitis B core antigen testing, viral markers, and occult hepatitis B virus infection in blood donors: implication for transfusion practice. Transfusion. 47(1):74- 79.

17. Indian J Hematol Blood Transfus (Jan-Mar 2011) 27(1):1–6 DOI 10.1007/s12288-010-0047-x

18. Department of Medical Microbiology, Faculty of Clinical Medicine, College of Health Sciences, Ebonyi State University, PMB 053, Abakaliki, Nigeria AIDS/Leishmaniasis Research Laboratory, Department of Zoology, University of Jos, Nigeria
GEDE AIDS & Infectious Diseases Research Institute, Maitama Abuja, Nigeria Department of Medical Microbiology, Jos University Teaching Hospital, Jos, Nigeria

19. B.Kishan Rao1, Durga.S.V2, Anuradha.B3, Seroprevalence of HIV, Hepatitis B & C viruses in healthy voluntary blood donors of college going students (16 – 25 years) at Khammam, A.P

Rao BK, SV D, BA. Seroprevalence of HIV, Hepatitis B & C viruses in healthy voluntary blood donors of college going students
(16 –25 years) at Khammam, A.P. Int J Res Health Sci [Internet]. 2014 Apr 30;2(2):720-3. Available from http://www.ijrhs.com/issues.php?val=Volume2&iss=Issue2

20. TigistBirku, BayeGelaw, FelekeMoges and Abate Assefa. Birkuet al. BMC Res Notes (2015) 8:737 DOI 10.1186/s13104-015-1719-2
Prevalence of hepatitis B and C viruses infection among military personnel at Bahir Dar Armed Forces General Hospital, Ethiopia.

21. Kapur S and Mittal A. Incidence of HIV infection and its predictors in blood donors in Delhi, Indian J Med Research 108: 45-50, 1998.

22. Sarin SK, Saxena R, Sundaram KR, Transfusion associated hepatitis, risks and estimates in Indian population in transfusion associated hepatitis, Sarin SK, Hess G eds; IstEdn. CBs publishers and distributors, New Delhi 212-218, 1998.

23. Joshi SR Seropositive status for HIV infection among voluntary and replacement blood donors in the city of Surat from Western Indian. Indian J Hemat and blood Transf 16: 20-21, 1998.

24. Kulkarni MG, Koppikar GV, Mehta PR, Borges NE. Seroprevalence of HIV-1 infection in Bombay (B321) in abstracts from the 2nd International Congress on AIDS in Aisa and The pacific No.92.

25. Ramanamma MV and Rfamani TV. A Preliminary report on the seroprevalence of HIV-2 in Visakhapatnam. Indian J Med Microbiol 12: 212-215, 1994.

26. TallaorShashikala S, Shahapurkar A and Krishan BVS. Prevalence of HIV infection among blood donors in North Karnataka. Indian J Med Microbiol 15: 123-125, 1997.

27. Allian jean-pieree, Angela R, Kuhnus Mary C, Namara Anne MC. Clinical importance of HCV confirmatory testing in blood donors. The Lancet 339,1992.

28. Deshpande A, Kumar A, Khodaiji S and Gupta AD. Prevalence of HCV antibody in healthy blood donors. Indian J Hematol and Blood Transf 16: 71-72, 1998.

29. Pahuja S, Sharma M, Baitha B, Jain M (2007) Prevalence and trends of markers of hepatitis C virus, hepatitis B virus and humany immunodeficiency virus in Delhi blood donors. A hospital based study. Jpn J Inf Dis 60:389–391

30. Kaur H, Dhanoa J, Pawar G (2001) Hepatitis C infection amongst blood donors in Punjab–a six year study. India J Hemat Blood transf 19:21–22

31. Garg S, Mathur DR, Gard DK (2001) Comparison of seropositivity of HIV, HBV, HCV and syphilis in replacement and voluntary blood donors in western India. Indian J Pathol Microbiol 44:409–412

32. Singh K, Bhat S, Shastry S (2009) Trend in seroprevalence of Hepatitis B virus infection among blood donors of coastal Karnataka, India. J Infect DevCtries 3:376–379

33. Srikrishna A, Sitalakshmi S, Damodar P (1999) How safe are our safe donors. Indian J Pathol Microbiol 42:411–416

34. Su FH et al. Forecasting the declining rate of chronic hepatitis-B 15. carrier status at a Taiwanese university: twenty years after implementation of an universal HBV vaccination program in Taiwan. *Chang Gung Medical Journal*, 2007, 30:521–528.