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Prevalence of hepatitis b (HBV) infection In pregnant women in district Kohat, Khyber Pakhtunkhwa, Pakistan

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Abstract
Hepatitis is the inflammation of liver tissues due to viral infection. Hepatitis is a serious problem worldwide. It may result in acute and chronic form. It may lead to liver cirrhosis or liver cancer. It is a contagious disease. The most frequent mode of transmission of this infection is oral, fecal and parenteral route. The main purpose of this study is to assess and monitor health status. Blood samples were collected from local hospitals and clinics of District Kohat. The present study revealed that the prevalence of hepatitis B virus (HBV) infection is higher in pregnant women in District Kohat. According to present study the prevalence of HBV infection is approximately 6% in District Kohat. Rate of HBV infection is more common in pregnant women who are aged between 25-29 years. This rate of HBV infection declined as the age of women increases. Preventative measure is important to reduce high prevalence of hepatitis B virus (HBV) that's why the awareness program should be initiated in a society.

Keywords: Hepatitis, Viruses, Prevalance, Pregnant women, Inflammation, Contagious, Liver cirrhosis, Liver cancer

Introduction
Hepatitis B virus abbreviation as (HBV) virus is the double stranded DNA type [1]. Hepatitis B virus is the species of the genus *orthohepadna*virus [2]. The genus is classify as part of the *Hepadnaviridae* family, which include two other genera: the *Avihepadna* virus and the second, which has so far to be assigned [3]. The virus is alienated into four major serotypes: adr, adw, ayr, ayw, based on antigenic epitopes there on its covering proteins. Hepatitis B virus is the primary cause of severe liver infection, counting hepatocellular carcinoma and cirrhosis-related end-stage liver diseases [4]. The (WHO) estimates that there are 350 million people with continual HBV infection overall [1]. Pakistan is amongst the most terrible afflict nations. Pakistan has one of the world's maximum productiveness rates. Yet up to 25% of hepatitis B carriers go on to develop liver damage later in life. Over many years, this damage to the liver may cause cirrhosis, a serious liver disease which creates a further risk of liver cancer [5]. Transmitted through blood and dirty bodily fluids as well as through saliva, menstrual, vaginal, and seminal fluids. Transmit through direct blood-to-blood contact, unprotected sex, use of unsterile needles, and from an infected woman to her newborn during the liberation process. Infection can take place throughout medical, surgical and dental procedures, tattooing and through the use of razors and similar objects that are contaminated with infected blood. Rarely, hepatitis B can be transmitted through transfused blood products, donated livers and other organs. Hepatitis B is not spread through food, water, or by casual contact. The diagnosis of HBV infection and its associated disease is based on a constellation of clinical, biochemical, histological, and serologic findings [6]. The laboratory can test for a wide range of HBV antigens and antibodies, using immunoassay based on enzyme reactivity (EIA) or chemiluminesence (CLIA) and ELISA. Hepatitis B virus (HBV) DNA can be quantified in serum or plasma using real time polymerase chain reaction (PCR) assays [7].

Life cycle of HBV
The life cycle of hepatitis B virus is complex. Hepatitis B is one of a few known nonretroviral virus.

1. Attachment
The virus gains entrance into the cell by strap to a receptor on the outside of the cell and enters it by clathrin-dependent endocytosis. The cell outside receptor has been identified as the Sodium/Bile acid co-transporting peptide SLC10A1 (also named NTCP).

2. Penetration
The virus covering, then fuses with the host cell's membrane releasing the DNA and core proteins into the cytoplasm.

3. Uncoating
Since the virus multiplies via RNA made by a host enzyme, the viral genomic DNA has to be transferred to the cell nucleus. It is attention the capsid is elated on the microtubules to the nuclear pore. The center proteins dissociate starting the in part double stranded viral DNA which is then made fully double stranded and transformed into covalently closed circular DNA (cccDNA) that serves as a template for transcription of four viral mRNAs.

4. Replication
The largest mRNA (which is longer than the viral genome) is worn to build the new copies of the genome and to make the capsid core protein and the viral DNA polymerase.

5. Assembly
These four viral transcripts undergo additional processing and go on to form progeny virions which are released from the cell or returned to the nucleus and re-cycled to produce even more copies.

6. Release
The long mRNA is then transported back to the cytoplasm where the virion P protein synthesizes DNA via its reverse transcriptase activity [6, 8].

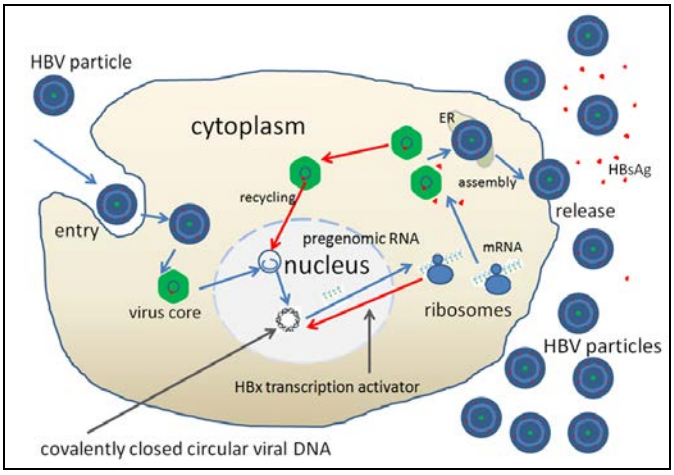

Fig 1: Life cycle of HBV

HBV infection in pregnant women
It is estimated that more than two billion people have been infected by HBV worldwide and 350 million people have chronic infection. When a pregnant woman is infected with HBV, there is a chance that she may infect her fetus. It has been reported that 1020 % of women are seropositive for both HBsAg and HBeAg, vertical transmission is approximately 90%. Chronic HBV infection has been defined as carriage of HBsAg for at least months and the highest risk (80-90%) of chronic infection have been found among infected neonates born to HBeAg positive carrier mother followed (30%) by children's infected before 6 years of age [9].

Routes of HBV transmission from mother to children (MTCT)
1. Intrauterine transmission is the detection of HBsAg or HBV DNA in neonatal peripheral venous blood or cord blood. It may occur either from sperms or maternal oocytes in the early embryonic stage. Mother to child transmission during intrauterine life occurs through maternal blood cells to cells in the placenta or by placental leakage at the time of preterm labor [10-11].
2. Intrapartum transmission has a strong association with duration of the first stage of labor lasting >9 hours. Partial placental leakage and trauma due to instrumentation during labor increase the rate of MTCT due to mixing of fetal and maternal blood (micro transfusion) [12]. There is no convincing evidence that postpartum transmission occurs due to ingested vaginal secretion at the time of birth, although the HBsAg was detectable in 90% of gastric lavage fluid of infants born to infected mothers, probably due to intact oral and gastric mucosa [13]. The case of mothers to infant transmission of HBV infection occurs in large proportion occurs during the intrapartum period [14].
3. Post-partum HBV MTCT with breastfeeding is also controversial. HBsAg was detected in 72% of breast milk samples and can be transmitted especially if mothers had abrasion on the nipple. However the published data does not support the risk of transmission through this route [15].

Prevention of HBV infection in MTCT
There are three different prevention strategies available to prevent HBV MTCT.

1. Vaccine
The cornerstone of preventing HBV MTCT is active immunization at birth. HBV vaccine was the first available vaccine to prevent cancer and the first recombinant vaccine.

2. Hepatitis B Immunoglobulin
Hepatitis B immunoglobulin (HBIG) reduces the risk of HBV transmission and is used in resource rich settings where pregnant women have high viral loads.

3. Antiviral therapy during pregnancy
Even where women have access to birth dose vaccine and HBIG there remains a 5-10% failure rate. This occurs in women with high HBV viral loads. For these women, ART during pregnancy has been shown to significantly reduce the risk of MTCT. Where mothers do not need ART for their own health, therapy can be used during pregnancy with the primary aim of reducing the risk of MTCT of HBV. Tenofovir, lamivudine and telbivudine are nucleotide inhibitors, which act as chain termination in DNA elongation and can be administered from 28 weeks gestation.

Materials and Methods
Study Area
The study was conducted in District Kohat, Khyber Pakhtunkhwa, Pakistan. The estimated population of Kohat is approximately 562,640 people. The ethical approval was given by the ethical committee of Zoology department KUST Kohat, KP, Pakistan. Blood samples were collected from pregnant women from local hospitals and clinics of district Kohat Pakistan. Till now 100 samples have been collected from pregnant women aged between 18-45 years. Almost 6% of the collected samples were infected with HBV. More samples will be collected for appropriate results.

Fig 2: Procedure of ICT test

Results

Through immune-chromatographic test 100 pregnant women were tested from 8 December 2016- 12 June 2017. Among these 100 pregnant women 94 about (94%) women were negative against HBV infection. In 100 pregnant women 6 about (6%) women were sero-positive against HBV infection. The study was made for prevalence of HBV infection among 100 pregnant women on the basis of their age groups. According to the study, 3 pregnant women about (50.1%) have an age between 25-29 years. And 2 pregnant women about (33.3%) have an age between 30-39 years. And 1 pregnant woman about (16.6%) has age above 40 years.

Table 1: Prevalence of Hepatitis B Virus (HBV) infection among pregnant women of district Kohat, Khyber Pakhtunkhwa, Pakistan

Total number of tested samples for pregnant women / In percentage %	Total number of HBV negative pregnant women /In percentage %	Total number of HBV positive pregnant women / In percentage %
100 (100%)	94(94%)	6(6%)

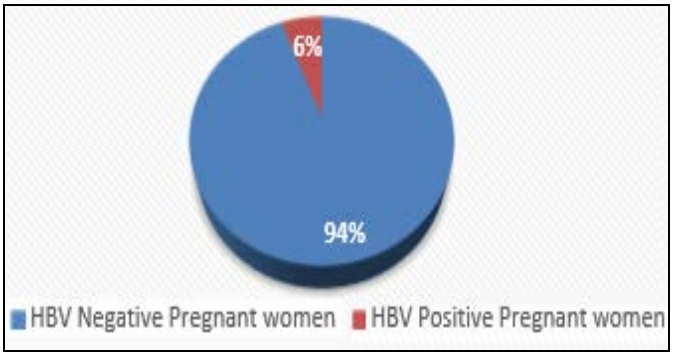

Fig 3: Prevalence of HBV infection among pregnant women of District Kohat

Table 2: Prevalence of Hepatitis B virus (HBV) infection among pregnant women on the basis of different age groups of district Kohat, Khyber Pakhtunkhwa, Pakistan

Different age groups	Number of HBV positive pregnant women	HBV positive pregnant women in percentage (%)
25-29 years	3	51.1%
30-39 years	2	33.3%
Above 40 years	1	16.6%

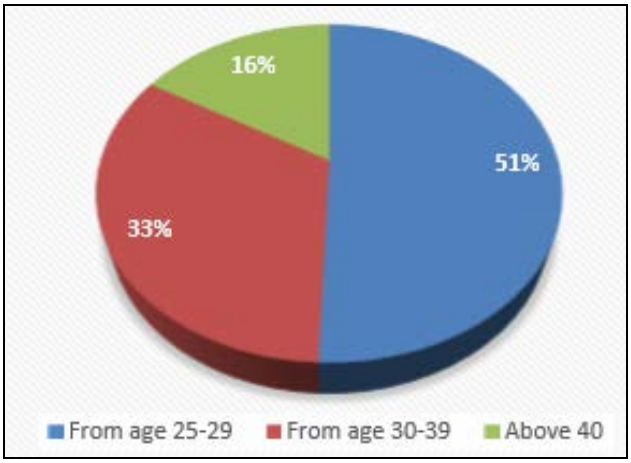

Fig 4: Prevalence of HBV infection among pregnant women on the basis of their different age groups

Discussion

Viral hepatitis is the major health problem world-wide in all countries, including Pakistan [16]. HBV infection among pregnant women is transmitted through inadequately sterilized medical instruments, reuse of syringes and unhygienic environment [17]. The results were compared with the results of other cities in Pakistan, which are approximately 4.5% [18]. Whereas the result of the present study is more than other cities of Pakistan, which is approximately 6%. The prevalence of HBV infection in pregnant women is high due to the use of unsterilized instruments using during delivery due to previous surgeries. It also happens due to low medical cure like reuse of syringes and unhygienic environment, ear and nose piercing, poverty, illiteracy and unawareness. HBV infection is not decreasing in general population day by day. [19-20]. In the present study 100 pregnant women were observed who were aged between 20-44 years. Women were divided into three different groups on the basis of their age. Age groups were 25-29 years 30-39 years and 40-44 years. Women in the age group 25-29 years have the highest HBV infection rate. This HBV infection rate decline towards 40-44 years age group women. According to the studies which were happening in other cities of Pakistan 51.8 % of the infected women were of age group (25-29) [21]. 32.7% infected women were of age group (30-39) [22]. Only 15.5% of infected women were aged 40-44 years [22]. The present study revealed that there were high prevalence of HBV infection in pregnant women who were aged between 25-29% years was (50.1%). This is because of the high fertility rate of women during this age. This age is the best age to produce more offspring's. The prevalence of HBV infection in pregnant women who were aged between 30-39 years was (33.3%). The prevalence of HBV infection in pregnant women whose age were above 40 years was (16.6%). At the age of women increases from age 25-29 women are not able to reproduce more offspring's. This is due to many reasons like poor health conditions, poverty, male nutrition and Islamic unawareness.

Conclusion

The result of the present study revealed that prevalence of HBV infection is higher in pregnant women in Kohat as compared to other cities of Pakistan. Preventive measures should be signified. Preventive measures like a safe blood transfusion, the importance of blood screening procedures, effective techniques of sterilization for equipment, use of disposable syringes must be highlighted in public. It is suggested that best care should be implemented during surgical measures or treatments during pregnancy because there are greater chances of having infection.

There is low awareness in Kohat about the risk factors and associated co-morbidities of viral hepatitis. Growing trend of

viral hepatitis demands mass awareness and early detection of disease in Kohat. Thus the preventive measures and effective vaccination program need to be initiated to improve the health and literacy rate. Awareness, movement also should be approved to instruct the common people on the risk factors and routes of transmission in order to reduce high prevalence of HBV infection in Kohat.

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