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Prevalence of Hepatitis B and Its Associated Factors Among Pregnant Women in Mogadishu, Somalia

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ABSTRACT

Background: Hepatitis B is a major global health problem caused by viral infection that attacks the liver and can cause both acute and chronic disease. There are about 65 million individuals who carry HBV in Africa, with a 25% mortality risk. In sub-Saharan Africa, the prevalence of HBV infection ranges from 9-20%. Pregnant mothers who test positive for both hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg) have 70–90% risk of transmitting infection to their newborn infants and about 10–40% risk if they test positive for only HBsAg. Therefore, pregnant women should be routinely screened for HBsAg and hepatitis B vaccine administered at birth to the infants whose mothers test positive. Objective: To identify prevalence of Hepatitis B (HBsAg) and its associated factors among pregnant women in Mogadishu, Somalia. Methodology: This was a hospital based cross-sectional study. This design was used to identify potential risk factors associated with development of Hepatitis B virus. Cross-sectional was used to assess the frequency and distribution of Hepatitis B among pregnant women and to investigate factors associated with it. The study instruments were structured questionnaires which were both categorical and open ended. Data was entered and analyzed with SPSS version 16.0. Both Univariate and Bivariate analysis were carried out to see frequencies and significant associations, a P-value less than 0.05 was considered as significant association. Result: The mean age of the respondents was 24.65 (±6.05) years. It was found that women in the age category of (≥30) were more likely to get Hepatitis B compared to those below categories (OR 1.69, 95%CI 1.11-1.89). The study revealed that 96.4% of the respondents were unemployed whose majority (79.1%) were from families of low economic status and these were 2.1 times more likely to contract Hepatitis B compared to the pregnant women who are in the category of middle and high economic status (OR 2.1 95% CI 1.25-3.21). The study reported that mothers with gravidity of 7 and more were 2.1 times (OR 2.1, 95%CI 1.31-3.04) more likely to get hepatitis B compared to mothers with gravidity between1-6. Moreover, prevalence of hospital delivery was around one-third (36.5%) while almost another one-third was attended by TBAs. Finally, the study has found that the seroprevalence of HBsAg among pregnant women was 4.12%. Conclusion and Recommendation: The study found out that HBsAg prevalence among pregnant women in Mogadishu was 4.12%, significantly associated with age, economic status, gravidity, birth attendant and abortion. It is recommended that MoH and health professionals adopt universal screening of all pregnant women for HBsAg during each pregnancy, prophylaxis and routine vaccination of both mothers and infants and also management of Hepatitis B cases.

Key words: Hepatitis, prevalence of HBsAg, pregnant women, antenatal care

BACKGROUND INFORMATION

Hepatitis B is a viral infection that attacks the liver and can cause both acute and chronic disease. The virus is transmitted through contact with the blood or other body fluids of an

infected person. An estimated 257-350 million people are living with hepatitis B virus infection (defined as hepatitis B surface antigen positive). In 2015, hepatitis B resulted in 887 000 deaths, mostly from complications (including cirrhosis and hepatocellular carcinoma).

There are about 65 million individuals who carry HBV in Africa, with a 25% mortality risk. In sub-Saharan Africa, the prevalence of HBV infection ranges from 9-20% (Kiire, 1996 & Kramvis, 2007). This high prevalence is derived from epidemiological data which remain insufficient in this part of Africa.

Strickland and El-Kamary (2013) argued that although the virus is present worldwide, some populations in sub-Saharan Africa, Southeast Asia, Eastern Europe, and the Middle East, as well as in indigenous communities are Hepatitis B carriers. Travelers getting tattoos or piercings abroad, using drugs intravenously, sharing needles and razor blades, undergoing dental, medical or delivery procedures, infants of Hepatitis B virus positive or having unprotected sex are at risk.

In regions of the world where hepatitis B is highly endemic, HBV accounts for around 3% of the total mortality, ranking with other vaccine preventable childhood diseases such as measles, tetanus, pertussis, and polio. Of the world's approximately seven billion people, 3.8% live in areas of moderate to high hepatitis B endemicity (carrier rate >2%). Therefore World Health Organization (WHO) considers hepatitis B virus (HBV) to be second to tobacco among the carcinogens (Maynard, 1990 and WHO, 2017).

Pregnant mothers who test positive for both hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg) have 70–90% risk of transmitting infection to their newborn infants and about 10–40% risk if they test positive for only HBsAg. (Beasley, 1982 and Alter, 2003). Therefore, pregnant women should be routinely screened for HBsAg and hepatitis B vaccine administered at birth to the infants whose mothers test positive.

As reported by (WHO, 2017) consequences of HBV infection in pregnancy, besides vertical transmission, include an increased likelihood of occurrence of pre-term delivery and low birth weight. Furthermore, HBV infection has been reported to be associated with threatened preterm labour, antepartum hemorrhage as well as gestational diabetes mellitus (Strickland, 2013).

Chronic HBV infection in pregnant women is usually asymptomatic but can be associated with mild liver disease. The outcome depends on the severity of disease and presence of portal hypertension, whose presence indicates poor long term prognosis. In that case, abortion and sterilization should be opted for (Strickland, 2013).

It is argued that Hepatocellular carcinoma is rare in pregnancy due to the late age of presentation in females, the known male predominance, and the decrease in fertility in women with cirrhosis. Oral contraceptives and high parity are known to be at an increased risk. Furthermore, pregnancy is known to worsen the prognosis of patients with hepatocellular carcinoma (Lavanchy, 2004).

Reported consequences of HBV infection in pregnancy include an increased likelihood of occurrence of pre-term delivery and low birth weight (Cunninghan and Leveno, 2005). Furthermore, HBV infection has been reported to be associated with threatened preterm

labour, antepartum haemorrhage as well as gestational diabetes mellitus (Tse, Ho, and Lao, 2005).

As reported by WHO the prevalence of HBV infection among pregnant women in African countries ranges from 6% to 25% (WHO meta-analysis done 2007). However, a study done in Nigeria showed that the prevalence to be 4.3% (Akani, Ojule, Opurum, and Ejilemele, 2005), while in Sudan the prevalence found was 5.6% (Elsheikh et al, 2007) and that one of Kenya was 9.3%, still another study done in Tanzania showed a prevalence of HBsAg among pregnant women was reported to vary between 3.5% and 6.3%.

Imagine that this serious public health problem is totally preventable with currently available safe and effective vaccines. WHO recommends that all infants should receive their first dose of vaccine as soon as possible after birth, preferably within 24 hours. Delivery of hepatitis B vaccine within 24 hours of birth should be a performance indicator for all immunization programmes. The birth dose should be followed by 2 or 3 doses to complete the primary series (WHO, 2017).

WHO also strongly recommends that all regions and associated countries develop goals for hepatitis B control appropriate to their epidemiological situation (WHO, 2017). In May 2016, the World Health Assembly endorsed the Global Health Sector Strategy (GHSS) on viral hepatitis 2016–2021. The GHSS calls for the elimination of viral hepatitis as a public health threat by 2030 (reducing new infections by 90% and mortality by 65%) (WHO, 2017).

The information is important in relation to the adoption of recommendations made by WHO on screening of pregnant women and offering the at-birth-dose of HBV vaccine to prevent perinatal transmission for those mothers who test positive.

Little is known about the prevalence of Hepatitis B among pregnant women in Somalia for the last three decades. This lack of information led the community to remain unaware of the common modes of infection transmission, its preventive and control measures.

PROBLEM STATEMENT

The virus that causes Hepatitis B attacks the liver and can cause both acute and chronic disease. It is a major global health problem, and the most serious type of viral hepatitis. Hepatitis B mortality is estimated about 780,000 people die each year due to consequences of hepatitis B, such as liver cirrhosis and liver cancer. The virus is highly contagious and is transmitted through contact with the blood or other body fluids of an infected person through various modes of transmissions. Although it is preventable with currently available safe and effective vaccines, it is still a serious public health problem in Sub-Saharan Africa and especially Somalia where all healthcare infrastructures had collapsed due to lack of effective central government for the last three decades.

According to WHO classification, the prevalence of chronic HBV infection varies geographically, from high (>8%), intermediate (2-7%) to low (<2%) prevalence. Although EMRO was once a region of high-to-intermediate Hepatitis B epidemicity, it is now low-to-intermediate endemicity, however Somalia which is in WHO EMRO region remains in the category of high HBsAg prevalence of more than 8% (WHO, 2017). The prevalence of the infection in Somalia is significantly higher than almost all the countries in EMRO region. Though little is known about the prevalence of Hepatitis B surface antigen among pregnant women, it is hypothesized that the incidence and prevalence of HBsAg among Somali women are also high. This is mainly due to lack of community awareness on predominant modes of Hepatitis B transmission in general

and risks of infection transmission related to socio-demographic factors of Somali women, behavioral factors, occupational factors as well as pregnancy and childbirth aspects. Vertical transmission from the mother to the child is one of the major modes of transmission that is not given its priority.

Despite recommendations proposed by WHO since 2002 of screening all pregnant women against HBV and universal immunization of all infants against HBV infection, routine screening of HBV among pregnant women is not practiced in most health centers and hospitals in the country and we don't have recent data on the magnitude of the problem.

Furthermore, the WHO Global Health Sector Strategy (GHSS) calls for the elimination of viral hepatitis as a public health threat by 2030 was not yet adopted as intervention strategy in the country. Therefore, if these situations are left unidentified and not getting involved (not intervened) and let it continue, consequently it will lead to an escalating rate of Hepatitis B morbidity and mortality in the country.

This study was aimed at assessing the prevalence of Hepatitis B virus and its associated factors among pregnant women in Mogadishu, Somalia.

OBJECTIVES

Main Objective

To identify prevalence of Hepatitis B (HBsAg) and its associated factors among pregnant women in Mogadishu, Somalia.

Specific Objectives

1. To identify prevalence of Hepatitis B (HBsAg) among pregnant women in Mogadishu women attending at antenatal department of SOS Hospital.
2. To establish factors related to HBV transmission among pregnant women attending at antenatal department of SOS Hospital.

LITERATURE REVIEW

Hepatitis is a medical condition defined by the inflammation of the liver and characterized by the presence of inflammatory cells in the tissue of the organ. The causes of hepatitis are varied with hepatitis viruses being very common. The hepatitis viruses are A, B, C, D, E, F, and G. Hepatitis A and E are transmitted by the feco-oral route. Hepatitis B and C can cause more chronic infection and transmitted either horizontally or vertically (who, 2013).

Unlike tuberculosis, HIV/AIDS and malaria that have attracted both national and international attention, Hepatitis B infection has been relegated to the background such that information about the infection is even difficult to obtain. For developing countries the major reason for this would be inadequate funds for voluntary mass testing, vaccination and treatment. With most of infected carriers are not aware of their status (GHS 2009), raising awareness is crucial to stemming the tide of new infections and reducing the stigma associated with the infection (Higginsetall, 1996).

The widespread use of hepatitis B vaccine in infants has considerably reduced the incidence of new chronic HBV infections. Between the prevaccine era (which, according to the year of introduction can range from the 1980s to the early 2000s) and 2015, the proportion of children under 5 years of age who became chronically infected fell from 4.7% to 1.3%. The

remaining infections mostly occur from the mother at birth or through contact with other infected young children (WHO, 2017).

WHO estimates that in 2015, 257 million persons, or 3.5% of the population, were living with chronic HBV infection in the world. The African and Western Pacific regions accounted for 68% of those infected. 2.7 million persons were co-infected with HBV and HIV. Most of the people currently living with HBV infection are persons born before hepatitis B vaccine was widely available and used in infancy (WHO, 2017).

Status of Hepatitis B

Most of the burden of disease from HBV infection comes from infections acquired before the age of 5 years (Beasley et al, 1977). Therefore, prevention of HBV infection focuses on children under 5 years of age. The United Nations selected the cumulative incidence of chronic HBV infection at 5 years of age as an indicator of the Sustainable Development Goal target for "combating hepatitis" (World health statistics 2016). This indicator is measured indirectly through the proportion of children 5 years of age who have developed chronic HBV infection (i.e. the proportion that tests positive for a marker of infection called hepatitis B surface antigen HBsAg).

Infants born to untreated HBV-infected mothers can acquire infection from the mother, mostly during birth. Infants born to mothers who are positive for both HBsAg and hepatitis B e antigen (HBeAg) are at a higher risk of acquiring infection (transmission risk for HBsAg positive and HBeAg-positive mothers: 70–100% in Asia and 40% in Africa) than those born to HBsAg-positive mothers who have lost the HBeAg (5–30% in Asia and 5% in Africa) (Beasley et al, 1977, Okada, 1976 and Keane, Funk and Shimakawa, 2016). Early vaccination of the baby against hepatitis B with a first dose within 24 hours of birth (timely birth dose) contributes to the prevention of mother-to-child transmission. The efficacy of the vaccine decreases with the concentration of HBV in the blood of the mother. HBeAg-negative mothers have a near 0% risk of transmitting HBV to their offspring vaccinated at birth (Machaira et al, 2015), while HBeAg-positive mothers have a 20% risk of transmitting the virus despite vaccination at birth (Lee, etal, 2006). Treatment of pregnant mothers with antivirals, which is being introduced as a new intervention to prevent mother-to-child transmission of HBV, should further reduce the risks of transmission (Brown et al.2016).

The low incidence of chronic HBV infection in children under 5 years of age at present can be attributed to the widespread use of hepatitis B vaccine. Worldwide, in 2015, the estimated prevalence of HBV infection in this age group was about 1.3%, compared with about 4.7% in the pre-vaccination era. However, the prevalence was still 3% in the African Region. This fall in the incidence of chronic HBV infections among children means that in the long term, the global hepatitis B epidemic will decline. However, deaths among infected adults born before the era of vaccination will continue to increase if they are not diagnosed and treated.

Global Prevalence of HBV infection

In 2015, the global prevalence of HBV infection in the general population was 3.5%. Among those born before the hepatitis B vaccine became available, the proportion of persons living with chronic HBV infection remains high. In terms of WHO regions, prevalence was the highest in the African (6.1%) and Western Pacific regions (6.2%). Overall, about 257 million persons were living with HBV infection. Assuming that women of reproductive age constitute 25.3% of the world's population (United Nations data), adults chronically infected may include 65 million women of childbearing age who can potentially transmit HBV to their babies. In addition, a proportion of these adults would benefit from long-term, if not lifelong, treatment,

particularly those above 30 years of age, those who have cirrhosis, and those with HIV infection (WHO, 2015). This proportion of patients who would benefit from treatment is not well known. In community-based studies, reports range from less than 5% (Lemoine et al 2016) to about 10% (Shankar et al. 2016). In health-care facility-based studies, the proportion is higher (Spradling, et al. 2016).

Prevalence of Hepatitis B virus among Pregnant Women

The reported prevalence of HBV infection among pregnant women in African countries ranges from 6% to 25% (WHO, 2007). However, a study done in Nigeria showed the prevalence to be 4.3% (Akani, Ojule, Opurum and Ejilemele, 2005), while in Sudan the prevalence was 5.6% (Elsheikh et al, 2007). The reported prevalence of HBsAg in Kenya was 9.3%, while that of HBeAg was 18.8% in a study done in 2001 to 2002. It was concluded in that study that there was a high carrier rate, and it also questioned on the results from the previous studies which reported low prevalence (Okoth et al. 2006). Tanzania was also reported to be one of the countries with high endemicity levels of HBV infection according to the World Health organization WHO. This is defined as a prevalence rate equal to or greater than 8% (WHO, 2002). In 1987, the HBsAg carrier rates in Tanzania were estimated to be 10% and 15% among the general population and pregnant women respectively (Haukenes, Mbena, Rustad, 1987).

Apart from prevalence of 3.5% (Kibassa and Msengi, 2004) and 6.3% (Menendez et al. 1999) reported among pregnant women in studies done in mid-1990's, a figure as high as 56.7% was reported by Shao et al in a study done in 1989 (Shao, Haukenes, Yangi, and Vollset 1993). In the same study, the seroprevalence of HBsAg in HIV infected pregnant mothers was found to be 66.7% (Shao, Haukenes, Yangi, and Vollset 1993). Matee et al found the prevalence of HBsAg to be 11.0% among blood donors (Matee and Lyamuya, 2008) while Nagu found 17.3.% among HIV patients at MNH (Machaira et al, 2015).

Pregnant women are not spared from HBV infection in which case the great concern is that their babies may also be affected. Indeed it is reported that 70%-90% of chronic HBV infections occur following the acute infections taking place during childhood (Kasper, Braunwald, Fauci, 2006).

Furthermore, in a previous study done in India, 2.25% of children under five were found to be positive for HBsAg despite immunization, and no statistically significant difference was observed between the age groups, suggesting that most of the infections occurred via vertical transmission (Chakravarti, Rawat, and Jain, 2005).

Kasper, Braunwald, and Fauci (2006) argued that the main modes of transmission of HBV are via blood, during sexual intercourse and perinatally. Vertical transmission from mother to infant in the perinatal period is a major mode of transmission in regions where hepatitis B is endemic through ingestion of maternal fluids (amniotic fluid, vaginal secretions, and blood (Kasper, Braunwald and Fauci, 2006). Transplacental transmission is reported to be low, even to those infected mothers on whom amniocentesis has been done to (Towers, Asrat and Rumney 2001 & Alexander et al, 1999).

Factors Associated with Acquisition of Hepatitis B Virus (HBV)

Hepatitis B is a viral infection that attacks the liver and can cause both acute and chronic disease. The virus is transmitted through contact with the blood or other body fluids of an infected person. Other factors reported to be associated with acquisition of HBV include increasing age, male gender, low level of education and history of previous surgery, multiple

sexual partners, HIV infection, and non-use of condoms (Bwogi et al. 2009 & Ferreira et al. 2009). Moreover, it was found that heterosexual sex is the main mode of transmission accounting for 85.0% of all reported cases in 2008. Mother to child transmission was less than 6.0% and blood transfusion was less than 1.0% (NACP, 2009).

Among pregnant women with high parity, polygamy, multiple sexual partners and previous history of sexually transmitted disease were shown to be among the significant risk factors for HBV infection in Nigeria (Obi, Onah, and Ezugwu, 2006). In contrary to the above stated facts, a study done by Kibassa and Msengi in 2004 showed no association with marital status, previous history of jaundice, history of blood transfusion and age.

Since HIV and HBV share the modes of HIV transmission, it is plausible that HBV and HIV co-infection can occur, and this has been documented. Co-infection in Tanzania among HIV infected patients was found to be 17.3% among patients attending the Care and Treatment centre at the **MNH** (Machaira et al, 2015). Co-infection with HIV in pregnant women could occur since the modes of transmission are shared. A study done among pregnant women showed that one out of sixteen HIV infected had HBV infection as well.

HIV/AIDS is a major global health problem. By the end of 2009, it was estimated that 33.3 million people worldwide were living with HIV and AIDS. Sub-Saharan Africa is the world most severely affected region (UNAIDS, 2010).

In Somalia as reported by UNAIDS (2016), adults and children living with HIV was estimated 24000 of whom 11000 are females over 15 years old with overall prevalence in the general population of 0.4%.

Of the estimated 350 million individuals chronically infected with hepatitis B virus (HBV) worldwide, it is generally accepted that at least 50% acquired their infections either perinatally or in early childhood, especially in countries where HBV is endemic (Alter, 2003). This is attributed to the high rates of HBeAg-positive infections in women of child-bearing age in these parts of the world, and the efficient transmission of infection from these women to their newborns. It has long been recognized that prevention of perinatal transmission is a high priority in the attempt to decrease the global burden of chronic HBV (Alter, 2003).

Immuno-prophylaxis with hepatitis B immune globulin (HBIG) and hepatitis B vaccine is known to be safe and effective, but applied variably in different geographical regions. Even with proper vaccination, 5–10% of infants of HBeAg-positive women become infected, and so there is opportunity for improvement in prevention strategies. In addition, the interaction of HBV infection and pregnancy itself is an area for further study. The prevalence of chronic HBV infection in pregnant women in urban areas of the USA varies by race and ethnicity (Euler, Wooten, Baughman, and Williams, 2003). As expected, the highest rate (6%) is in Asian women. The rates in black, white and Hispanic women are 1, 0.6 and 0.14% respectively.

Effect of hepatitis B on pregnancy

Susceptible women who develop acute hepatitis B during pregnancy may have an illness indistinguishable from that in the general population. Acute HBV infection must be differentiated from other acute liver diseases that occur during pregnancy such as intrahepatic cholestasis or acute fatty liver of pregnancy if jaundice is present, or haemolysis, elevated liver enzymes and low platelets syndrome if jaundice is absent. It does not appear that acute HBV infection increases mortality during pregnancy, or that it has teratogenic effects. However, a higher incidence of low birth weight and prematurity has been reported. In addition, acute

HBV early in pregnancy is associated with a 10% perinatal transmission rate, and the rate increases substantially with HBV infection in the third trimester.

The effects of chronic HBV infection on pregnancy outcomes have not been clearly defined. One large study demonstrated no differences in gestational age at delivery, birth weight, incidence of prematurity, neonatal jaundice, congenital anomalies or perinatal mortality comparing HBsAg-positive women with controls (Wong, et al. 1999). However, a relatively recent study described an association of maternal HBV infection (HBsAg positive) with gestational diabetes mellitus and antepartum haemorrhage (Tse, Lo and Lao, 2005). There was a suggested association with preterm delivery.

Consideration of active HBV infection during pregnancy raises the question of whether amniocentesis is contraindicated in this setting. In one series of 21 mother–infant pairs, in which the mothers were HBsAg positive (but only one HBeAg positive) and underwent amniocentesis for accepted indications at a mean of 19.5 weeks gestation, none of the infants were HBsAg positive at 1 or 12 months of age (Alexander et al, 1999); they had received the HBIG and HBV vaccine as recommended.

Effect of pregnancy on hepatitis B

In general, women with chronic hepatitis B do well during pregnancy. However, pregnancy is associated with high levels of adrenal corticosteroids, which might be expected to increase levels of viraemia, and oestrogen, which has been demonstrated in laboratory animals to decrease HBV replication. In one study, no significant differences in HBV viraemia were noted during pregnancy, although alanine aminotransferase (ALT) levels tended to increase late in pregnancy and in the post-partum period (Soderstr¨om, Norkrans and Lindh, 2003). It has been known for some time that a proportion of women have hepatitis flares with or without HBeAg seroconversion within the first months after delivery (Lin et al. 1989). Seroconversion rates of 12.5% (Lin, Wu, and Kao, 2006) to 17% (Lin et al. 1989) have been described.

It has been postulated that the rapid decrease in cortisol levels characteristic of the post-partum state is analogous to the steroid withdrawal therapy that has been used to elicit seroconversion (Lin et al. 2006, & Ter-Borg, 2008). Although usually this is well tolerated, cases of exacerbation of hepatitis (Ter-Borg, 2008) and even fulminant hepatic failure (Yang, 2004) have been described in the peripartum period. Exacerbation of hepatitis was not prevented by administration of lamivudine in the third trimester (TerBorg, 2008). Factors that do not appear to be associated with likelihood of postpartum HBeAg clearance include maternal age, parity and presence of precore or basal core promoter mutations (Lin HH, et al. 2006). In one report, a low maternal HBeAg level was strongly associated with postpartum HBeAg clearance (Lin et al. 2006). It appears prudent to monitor HBV infected women closely for several months after delivery for hepatitis flares and seroconversion.

Perinatal hepatitis B virus transmission

Perinatal transmission of HBV results in a high frequency of chronic infection, up to 90% in infants born to HBeAg-positive women. It is widely accepted that most perinatal transmission occurs at or near the time of birth, because neonatal vaccination prevents newborn infection in about 80–95% of cases. Theoretical risks for HBV transmission at delivery include exposure to cervical secretions and maternal blood. Transplacental (intra-uterine) transmission is presumed to cause the minority of infections not prevented by prompt immunization. Risk factors for transplacental transmission of HBV include maternal HBeAg positivity, HBsAg titre and HBV DNA level (Xu, et al. 2002).

Threatened preterm labour or spontaneous abortion, with the possible mixing of maternal and fetal blood, appears to increase the risk of HBV transmission (Lin, Lee, Chen, et al. 1987). Recently, polymorphisms in some cytokine genes, such as those encoding for interferon-g and tumour necrosis factora, have been correlated with risk of intra-uterine infection with HBV (Zhu et al. 2005 & Yu, et al. 2006). Prevention of perinatal transmission is considered critical in the attempt to decrease individual and population morbidity from chronic hepatitis B infection as well as the global burden of hepatitis B.

Hepatitis B virus and human immunodeficiency virus co-infection during pregnancy

There are few reports of HBV co-infection with the human immunodeficiency virus (HIV) in pregnant women. In sub-Saharan Africa, where HBV is endemic, 13% of HIV-infected pregnant women also have HBV. In the only American series, 1.5% of 455 HIV infected obstetrical patients followed in Texas over 11 years were HBV co-infected (Santiago et al, 2005).

Hepatocellular carcinoma and pregnancy

There are rare recorded cases of hepatocellular carcinoma (HCC) in pregnancy. In several reports, fetal outcome was often satisfactory although some intrauterine deaths were recorded. Maternal mortality was high, suggesting an adverse effect of pregnancy on the outcome of this malignancy. Twenty of the 33 reported women in a combined series died within a few days of the initial presentation (Cobey and Salem, 2004, & dela-Rosa et al. 2006) and most others succumbed within months. It has been suggested that oestrogen may accelerate the evolution of HCC as it does for other liver tumours. In addition, gestational immune suppression may be an enabling factor in tumour progression (Lau, Leung, and Ho, 1995).

Vaccination against hepatitis B virus during pregnancy

Vaccination against HBV is both safe and efficacious during pregnancy (Gupta and Ratho 2003 & Levy and Koren, 1991). In addition, passive transfer of maternal antibody to newborns has been demonstrated, although without the addition of active vaccination, titres in the infants were noted to wane over time (Gupta and Ratho, 2003), as would be expected.

Immunoprophylaxis provided to newborns clearly reduces the incidence of perinatal HBV transmission. In a recent meta-analysis of clinical trials (Lee, Gong, Brok, Boxall, and Gluud, 2006), the relative risk of neonatal HBV infection in those who received HBV vaccine (plasma-derived or recombinant) was 0.28 [95% confidence interval (CI) 0.2–0.4] compared with those who received placebo or no intervention. Compared with vaccine alone, the addition of HBIG to the regimen further reduced the relative risk (0.54, 95% CI 0.41–0.73) when compared with active prophylaxis only. Nonetheless, there are clearly a substantial number of newborn infections, even with prompt administration of active and passive vaccination. The estimates vary, and depend on maternal HBeAg status, but most studies demonstrate anywhere from 1% (DelCanho, Grosheide, Mazel, et al. 1997) to 10% (Lee, Gong, Brok, Boxall and Gluud, 2006) chronic HBV infection in infants who were appropriately immunized. Clearly, with millions of at-risk pregnancies each year throughout the world, significant numbers of perinatally acquired chronic HBV infection are still occurring.

METHODOLOGY

Study setting

The study was conducted at SOS Mother & Child Hospital. SOS Mother and Child hospital is referral public hospital located in Mogadishu that receives its patients and clients from the various districts of Benadir Region as well as other regions of the country. It has both Pediatric and Maternity departments that offer free high quality CEmONC and childcare services.

Study design
This was a hospital based cross-sectional study. This design was used to identify potential risk factors associated with development of Hepatitis B virus. Cross-sectional was used to assess the frequency and distribution of Hepatitis B among pregnant women and to investigate factors associated with it.

Study period
The study was conducted between 1st August and 31st October 2017.

Study population
The study population was all pregnant women attending SOS Hospital for ANC services who hailed from different parts of Benadir Region.

Study instrument
The study instruments were structured questionnaires which were both categorical and open ended. Questionnaires were administered to the study participants who consented and fulfilled study eligibility criteria. Then blood sample was taken to determine the participant's HBsAg status.

Sample size determination
Sample size was calculated using Kish Leslie (1965) formula for cross sectional studies. Based on the 9.4% prevalence of HBsAg infection among pregnant women in Kenya, one of our neighboring countries which shares similar features with Somalia (Okoth et al. 2006). A sample size of 364 was studied using the Epi info Stat calculator based on prevalence of 9.4% with 3% error at 95% confidence interval.

The formula is:

$$n = \left[\frac{Z^2 PQ}{\delta^2} \right]$$

n - Sample Size
Z - Parameter related to error risk, equal to 1.96 or 2 for error of 5%
P = Expected prevalence of malnutrition of the population, expressed as a fraction of 1
d - Degree of accuracy, expressed as fraction of 1
q = 1-P, expressed proportion of children not malnourished, expressed as a fraction of 1

If
P = 9.4%
q = 90.6
Z = 1.96

By substitution

$$n = \left[\frac{Z^2 PQ}{\delta^2} \right]$$

=1.96^2 x0.094x0.906/0.03^2=364

Sampling techniques

All pregnant women attending at the ANC Department of SOS Hospital were consecutively enrolled until the desired sample size was reached.

Inclusion and exclusion criteria

Inclusion Criteria

All pregnant women attending SOS antenatal clinic for ANC services during the study period (August-October, 2017) who were willing to participate in the study

Exclusion criteria

All pregnant women attending at SOS antenatal clinic for the first time at SOS Hospital during the study period (August to October, 2017) who were too sick or those who were not willing to participate in the study.

Study variables

The study variables included socio-demographic factors, obstetric factors and risk factors which were believed to predispose women to Hepatitis B. **The socio-demographic factors** were: age at interview, respondent's residence, respondent's education, occupation of the respondent and economic status. **Other obstetric factors** included number of previous pregnancies (gravida), number of previous deliveries (para), mode of delivery, delivery attendant, delivery site and abortion. **The risk characteristics** were ear/nose piercing, injection, history of blood transfusion and surgical procedures.

Data collection

Pregnant women who consented to participate were subjected to a face-to-face interview with the investigator/assistant whereby pre-test counseling was done, and then the questionnaire was filled in to obtain information on socio-demographic, obstetrics and risk characteristics. At end of the interview a venipuncture was performed and blood collected in a vacutainer tube. Five (5 mls) milliliters of blood were collected for Hepatitis B serology.

Data were collected by third year nursing students who interviewed the participants and took the blood sample for investigation of HBsAg. All samples were screened, using a (Laborex HBsAg Rapid Test). All samples found to be positive for HBsAg were further tested for double checking and if again positive then were considered to be positive.

A mark was put in the clinic card of all enrolled mothers to avoid repeat inclusions during their subsequent visits.

Data management/analysis

Data were entered and analyzed with Statistical Package for Social Sciences (SPSS) version 16.0. The Mean, Standard deviation and test of comparison where categorical variables were summarized as proportions and some were further analyzed using Chi square and Fisher´s Exact Test to assess association between the variables. Test of association using Logistic Regression was done to describe the relationship between the predictor variables (risk factors for HBV infection found to be statistically significant) and the outcome variable (HBsAg). The P value < 0.05 was considered significant.

Quality assurance procedures

Training of research assistants

Senior nursing students who fluently speak both English and Somali languages were selected as research assistants and then trained for two days about the study objectives, interviewing

techniques, venipuncture, sample testing, data collection tools, ethical issues, responsibilities of data collectors and quality control.

Pre-testing
Data collection technique and tools were tested before the actual data collection at SOS MCH for piloting. Corrections were made where necessary to validate the tools.

Missing data
The returned and completed tools have been cross-checked by the researcher to ascertain their completeness. Questionnaires with missing data were re-administered to the respondents for correction.

Data Handling
Two research assistants were identified and trained to standardize data collection procedures. Soft copies of data were coded and hard copies locked in a locker in the office of the principal researchers. Research team had access to data only when permission was granted by the principal researchers.

Ethical considerations
Ethical clearance for this research was obtained from the SOS Hospital Administration, District Research Committee and individuals who were to be interviewed and taken their blood samples for investigation. Mothers, families and all participants were educated on the relevance of the study and included in the research based on their consent to participate.

Informed consent
The respondents were requested to participate in the research by answering the questionnaire through the research assistants and allowing them to test for HBsAg. Their participation was voluntary and they had the freedom to withdraw at any time if they might feel so and there was no victimization for any refusal to participate or withdrawal.

Privacy and Confidentiality
All information provided to the interviewers was strictly kept confidential and records securely stored in a locker. All information that respondents disclosed were handled with security and confidentiality.

Anonymity
The participant's name and identity were kept anonymous. Only their responses and findings were presented in the study.

RESULTS
During the study period of between 1st August and 31st October 2017, a total of three hundred and sixty four (N=364) pregnant women who attended at SOS Mother and Child Hospital for ANC services were enrolled in the study. This hospital is the only one of its kind in the country which has been offering free health services to mothers and children since early 1990s. These services are mainly utilized by patients and clients from poor urban and rural communities living mainly in South and central zones.

Demographic characteristics of the respondents
In this study 364 (100%) of the required sample pregnant women attending antenatal care were participated in the study. The mean age of the respondents was 24.65 (±6.05) years. A

majority of the respondents (56.3%) were in the age group of 20-29 years and about 21.2%, 20.9% & 1.6 % were in the age groups of 10-19, 30-39, & ≥40 years respectively. The most remarkable result to emerge from the data is that the pregnant women had age range of 13-42 years. The study also shows that majority of the women interviewed were married (94.0%) whose majority had no formal education (73.1%) as depicted in table 1 below.

Table 1: Demographic characteristics of the respondents

Variable	Frequency (%)
Residence	
Urban	327 (89.8)
Rural	37 (10.2)
Age	
10-19	77(21.2)
20-29	205(56.3)
30-39	76(20.9)
≥40	6(1.6)
Marital status	
Married	342 (94.0)
Divorced	19(5.20)
Widow	3(0.80)
Educational level	
No formal education	266 (73.1)
Primary school	54(14.80)
Secondary school	34(9.30)
Post-secondary	10(2.70)

Socio-economic characteristics of pregnant women (N=364)

As demonstrated by the table 2 below, majority of the respondents (96.4%) were unemployed, only the remaining (3.6%) were self-employed of small businesses. According to their economic status, the study has also identified that most of the interviewed women (79.1%) were from families of low economic status, while only small proportions of 18.7% and 2.2% of them were from families of middle and high economic status respectively. Among the respondents 20.9% have only ever engaged in more than one marriage compared to their husbands who did so (28.6%).

Table 2: Socio-economic characteristics of the respondents

Variable	Frequency (%)
Employment status	
Employed	13(3.6)
Unemployed	351(96.4)
Economic status	
High	8(2.2)
Middle	68(18.7)
Low	288(79.1)
No. of marriages engaged by the women	
One	288(79.1)
More than one	76(20.9)
No. of marriages engaged by the husband	
One	260 (71.4)
More than one	104 (28.6

Obstetric Characteristics of Pregnant Women

Regarding with obstetric characteristics of the respondents, the study revealed that majority of the women (53.8%) have already had 1-3 pregnancies on the period of data collection while some 27.5% have had 4-6 pregnancies with average of 3.9. Similarly, majority (53.8%) of the women had delivered 0-2 babies while 45.9% delivered 3 and more.

Moreover, the study found that 36.5% of the interviewed women delivered at a hospital and attended by qualified health professional while more than a third (34.6%) delivered at home by TBAs. However, there was small percentage of (5.8%) who delivered at health centers (EPHS) and others 23.1% were primagravidae. Furthermore, as shown in the below table some 26.1% of the respondents experienced abortion.

Table 3: Obstetric characteristics

Variable	Frequency (%)
Gravida	
1-3	196(53.8)
4-6	100(27.5)
7 or more	68(18.7)
Para	
0-2	197(54.1)
3-5	99(27.2)
>5	68(18.7)
Delivery site	
Home	126(34.6)
Health centre	21(5.8)
Hospital	133(36.5)
NA (Prima gravida)	84 (23.1)
Birth Attendant	
TBA	135(37.1)
Qualified health professional	143(39.3)
NA (Prima gravida)	86(23.6)
History of abortion	
Yes	95(26.1)
No	269(73.9)

Risk characteristics

Traditionally, it is customary that Somali girls pierce the ears at childhood and this study revealed that majority of the respondents (96.7%) had pierced the ears. Besides that the study showed that 90.4%, 32.7% and 41.2% had a history of injection, blood transfusion and minor or major surgical procedures respectively.

Table 4: Risk characteristics

Variable	Frequency (%)
History of ear piercing	
Yes	352(96.7)
No	12(3.3)
History of injection	
Yes	329(90.4)
No	35(9.6)
History blood transfusion	
Yes	119(32.7)
No	245(67.3)
History of surgical procedure	
Yes	150(41.2)
No	214 (58.8)

Demographic characteristics of the study participants and HBsAg serostatus

Study has found that majority 227(62.36%) were urban residents of whom 15 (4.12%) tested positive to HBsAg. This means that all positives were from urban residents. According to age brackets, women in the age group of 10-19 were 77 (21.15%) of whom 1 tested positive while the majority of the respondents 205(56.31) lie in the age brackets of 20-29 of whom 7 tested positive. Noteworthy is that the bracket 30-39 comprised of 76 (20.88%), 7 tested positive.

On the other hand, with respect to marital status, almost all (93.95%) of the interviewed respondents in the study period were married of whom all the 15 cases found in this category. Level of education, most of the respondents (73.07%) had no formal education and the most positives 10 out of 15 (67%) were found in this category.

Table 5: Demographic characteristics in relation to Hepatitis B serostatus

		HBsAg serostatus	
Characteristics	**No.**	**HBsAg +ve**	**HBsAg –ve**
Residence			
Urban	227	15(4.6)	212(93.4)
Rural	37	0(0.0)	0(0.00)
Age			
10-19	77	1(1.3)	76(98.70)
20-29	205	7(3.4)	198(96.60)
30-39	76	7(9.2)	69(90.80)
≥40	6	0(0.0)	6(100.00)
Marital status			
Single	0	0(0.0)	0(0.00)
Married	342	15(4.4)	327(95.60)
Divorced	19	0(0.0)	19(100.00)
Widow	3	0(0.0)	3(100.00)
Education level			
No formal education	266	10(3.8)	256(96.20)
Primary school	54	3(5.6)	51(94.40)
Secondary school	34	2(5.9)	32(94.10)
Post-secondary	10	0(0.0)	10(100.0)

Socioeconomic characteristics of the study participants and HBsAg serostatus

The study has also shown that pregnant women who tested positive were almost all (96.98%) unemployed. They were in low economic status category (79.12%) and again most of them engaged only one marriage.

Table 6: Socio-economic characteristics and Hepatitis B serostatus

Characteristics	No.	HBsAg serostatus HBsAg +ve	HBsAg -ve
Employment status			
Employed	11	1(9.1)	10(90.9)
Unemployed	353	14(4.0)	339(96.0)
Economic status			
High			
Middle	8	0(0.0)	8(100.0)
Low	68	1(1.5)	67(98.5)
Number of marriages engaged by the wife	288	14(4.9)	274(95.1)
One			
More than One	288	11(3.8)	277(96.2)
Number of marriages engaged by the husband	76	4(5.3)	72(94.7)
One	260	8(3.1)	252(96.9)
More than	104	7(6.7)	97(93.3)

Obstetric characteristics of the study participants and HBsAg serostatus

The study has demonstrated that women who conceived 1-3 pregnancies were 196 in number of whom 5 tested positive. Similarly those with previous conception of between 4-6 were 101 of whom 7 tested positive.

Table 7: Obstetric characteristics in relation to Hepatitis B serostatus

Characteristics	No.	HBsAg serostatus HBsAg +ve	HBsAg –ve
Gravida			
1-3	196	5(2.6)	191(97.4)
4-6	101	7(6.93)	94(93.07)
7 or more	68	3(4.41)	65(95.59)
Para			
0-2			
3-5	197	6(3.05)	191(96.95)
>5	99	6(6.06)	93(93.94)
Delivery Site	68	3(4.41)	65(95.59)
Home			
Health centre	126	9(7.10)	117(92.90)
Hospital	21	0(0.00)	21(100.0)
NA(Primagravida)	133	3(2.30)	130(97.70)
Birth Attendant	84	3(3.60)	81(96.40)
TBA			
Qualified Health Professional	135	9(6.70)	126(93.30)
NA(Prmagravida)	143	3(2.10)	140(97.90)
	86	3(3.50)	83(96.50)
History of abortion			
Yes	95	4(4.20)	91(95.80)
No	269	11(4.10)	258(95.90)

Risk characteristics of the study participants and HBsAg serostatus

The study has found that the majority 352(96.7%) of the study participants had a history of ear or nose piercing and all positive participants lie in this category. Similarly, most of the participants 329 (90.38%) underwent a history of injection. Furthermore, one third125 (34.34%) and almost half 150 (41.21%) of the interviewed pregnant women had a history of

blood transfusion and a minor or major surgical procedure in their lifetime. Out of the above mentioned figures, nine (9) of those who had a history of blood transfusion tested positive while only six (6) tested positive for those who had a history of surgical procedure.

Table 8: Risk characteristics in relation to Hepatitis B serostatus

Characteristics	No.	HBsAg serostatus	
		HBsAg +ve	HBsAg –ve
History of ear piercing			
Yes	352	15(4.3)	337(95.7)
No	12	0(0.0)	12(100.0)
History of injection			
Yes			
No	329	13(4.0)	316(96.0)
History of blood transfusion	35	2(5.7)	33(94.30)
Yes	125	9(7.20)	116(92.80)
No	239	6(2.51)	233(97.49)
History of surgical procedure	150	6(4.0)	144(96.0)
Yes	214	9(7.1)	117(92.9)
No			

Association between baseline and risk characteristics and Hepatitis B Surface Antigen

The results in Table 9 show that the mothers whose age between 30 and older are more likely to get hepatitis B compared to those whose age is younger than 30 (OR 1.0 95%CI 1.11-1.89). Moreover, mothers in the low economic status are 2.1 times more likely to contract Hepatitis B compared to the pregnant women who are in the category of middle and high economic status (OR 2.1 95% CI 1.25-3.21).

The study found that gravidity is significantly associated with Hepatitis B. As shown in table 6, mothers with gravidity of 7 and more were 2.1 times (OR 2.1, 95%CI 1.31-3.04) more likely to get hepatitis B compared to mothers with gravidity between1-6. The study has also shown that the mothers delivered by skilled birth attendant and those who have not yet delivered (primagravidae) were less likely to get hepatitis B compared to those mothers delivered by traditional birth attendant [0.68 (0.09-0.98)and 0.12 (0.01-0.77)].

Pregnant women who had abortion were 5.8 times more likely to get hepatitis B compared to those pregnant women who had no abortion (OR 5.80, 95%CI 1.93 – 17.42).

Education, employment, number of marriages engaged, ear piercing and history of blood transfusion were not significant in the study.

Table 9: Association between demographic, socio-economic, obstetric and risk characteristics and presence of HBsAg

		HBsAg Positive		
Characteristics	**N**	**n (%)**	**OR**	**95% CI**
Age				
10-29	282	8(2.84)	1.0	
30 and older	82	7(8.54)	1.69	1.11-1.89
Marital status				
Married	342	15(4.39)	7.36	.
Divorced	19	0(0.00)	.	.
Widow	3	0(0.00)	.	.
Education				
No formal	266	10(3.67)	1.0	
education	98	5(5.10)	0.73	0.24-2.18
Formal education				
Employment	11	1(9.1)	1.0	
status	354	14(3.95)	0.413	0.05-3.45
Employment				
Unemployed	8	0(0.00)	1.0	
Economic status	68	1(1.47)	1.6	0.87-2.11
High	288	14(4.86)	2.1	1.25-3.21
Middle				
Low				
No. of marriages	288	11(3.82)	1.0	
engaged by the	76	4(6.7)	1.3	0.57-1.89
wife				
One	196	5(2.55)	1.0	
More than one	100	7(7.00)	0.87	0.23-1.34
Gravida	68	3(4.41)	2.1	1.31-3.04
1-3				
4-6	197	6(3.05)	1.0	
7 or more	99	6(6.06)	0.68	0.17-2.80
Para	68	3(4.41)	1.39	0.33-5.79
0-2				
3-5	135	11(8.15)	1.0	
>5	143	1(0.70)	0.68	0.09-0.98
Birth attendant	86	3(3.49)	0.12	0.01-0.77
TBA				
Health professional	296	5(1.86)	1.0	
Primigravidae	95	10(10.53)	5.80	1.93-17.42
History of abortion				
No				
Yes	12	0(0.00)	1.0	
History of ear	352	15(4.26)	0.00	0.00
piercing				
No	35	2(5.71)	1.0	
Yes	329	13(3.95)	1.51	0.19-11.85
History of injection				
No				
Yes	239	6(2.51)	1.0	
History of blood	125	9(7.20)	1.1	0.25-1.67
transfusion				
No				
Yes				

DISCUSSION

Baseline characteristics

The mean age of the respondents was 24.65 (±6.05) years. A majority of the respondents (56.3%) were in the age group of 20-29 years and about 21.2%, 20.9% & 1.6 % were in the age

groups of 10-19, 30-39, & ≥40 years respectively. The most remarkable result to emerge from the data is that the pregnant women had age range of 13-42 years. It was found that women in the age category of (≥30) were more likely to get Hepatitis B compared to those below categories (OR 1.69, 95%CI 1.11-1.89).

The study also shows that majority of the women interviewed were married (94.0%) whose majority (73.1%) had no formal education. Education is one of the most important means of empowering women with the knowledge, skills and self-confidence necessary to participate fully in the development process in which the majority of Somali women are lacking and it is against the Universal Declaration of Human Rights asserted that "everyone has the right to education".

Similarly, as much as 96.4% of the respondents were unemployed whose majority (79.1%) were from families of low economic status. Moreover, mothers in the low economic status are 2.1 times more likely to contract Hepatitis B compared to the pregnant women who are in the category of middle and high economic status (OR 2.1 95% CI 1.25-3.21).

Regarding with obstetric characteristics, the study revealed that more than half (53.8%) of the women have already conceived 1-3 pregnancies on the period of data collection with average pregnancies of 3.9 in range of (1-15). The study reported that mothers with gravidity of 7 and more were 2.1 times (OR 2.1, 95%CI 1.31-3.04) more likely to get hepatitis B compared to mothers with gravidity between1-6. Moreover, only around one-third of (36.5%) of the interviewed women delivered at a hospital who were attended by qualified health professional while another third (34.6%) delivered at home by TBAs. However, there were small percentage of (5.8%) who delivered at health centers and others 23.1% were primagravidae. Furthermore, the study reported that more than a quarter (26.1%) of the respondents experienced abortion and aborted women were 5.8 times more likely to get hepatitis B compared to those pregnant women who had not experienced abortion (OR 5.80, 95%CI 1.93 – 17.42).

This result is in line with study conducted in Kenya by Jacqueline et al (2016) who found that parity and abortion have association with Hepatitis B [parity (χ^2 =7.128 df2 p<0.01), History of abortions (χ^2=9.094 df1 p<0.01)].

Traditionally, it is customary that Somali girls pierce the ears at childhood and this study revealed that majority of the respondents (96.7%) had pierced the ears. Besides that the study showed that 90.4%, 32.7% and 41.2% had a history of injection, blood transfusion and minor or major surgical procedures respectively.

Marital status, education, employment, number of marriages engaged, parity, ear/nose piercing, history of injection and blood transfusion were not significantly associated with Hepatitis B.

Prevalence of Hepatitis B among pregnant women

Hepatitis B virus (HBV) infection in a pregnant woman poses a serious risk to her infant at birth. Without postexposure immunoprophylaxis, approximately 40% of infants born to HBV-infected mothers in the United States will develop chronic HBV infection, approximately one-fourth of whom will eventually die from chronic liver disease.

This study has found that the seroprevalence of HBsAg among pregnant women attending at SOS Mother and Child Hospital was 4.12%. According to WHO, the prevalence of chronic HBV

infection in general population varies geographically, from high (>8%), intermediate (2-7%) to low (<2%) prevalence. WHO EMRO region was known to be a region of low-to-intermediate endemicity, and the study has confirmed that Somalia still remains in the category (WHO, 2017). However, this prevalence is significantly higher than almost all the countries in EMRO region.

Infection with HBV among pregnant women has been reported in a number of African countries. For instance, a study established in Kenya found that that the prevalence of HBV infections among pregnant women attending antenatal clinic at Mbagathi District Hospital was 3.8%. Another study done in Ethiopia determined that the prevalence of HBV infection among pregnant women was 6.9% (Abdi et al, 2016). A much higher prevalence of 11.0% has been reported from Guiana (Mahamat et al, 2010). In Nigeria, the seroprevalence among attendees of ANC was reported as 6.08% (Rabiu et al, 2010). On the other hand, HBsAg was detected in 1.5% pregnant women in Libya (El-Magrahe et al, 2010).

CONCLUSION AND RECOMMENDATION

Conclusion

The mean age of the respondents was 24.65 (±6.05) years. A majority of the respondents (56.3%) were in the age group of 20-29 years and about 21.2%, 20.9% & 1.6 % were in the age groups of 10-19, 30-39, & ≥40 years respectively. The most notable result to emerge from the data is that the pregnant women had age range of 13-42 years. It was found that women in the age category of (≥30) were more likely to get Hepatitis B compared to those below categories (OR 1.69, 95%CI 1.11-1.89).

Similarly, as much as 96.4% of the respondents were unemployed whose majority (79.1%) were from families of low economic status. Moreover, mothers in the low economic status are 2.1 times more likely to contract Hepatitis B compared to the pregnant women who are in the category of middle and high economic status (OR 2.1 95% CI 1.25-3.21).

Concerning with obstetric characteristics, the study revealed that more than half (53.8%) of the women have already conceived 1-3 pregnancies on the period of data collection with average pregnancies of 3.9 in range of (1-15). The study reported that mothers with gravidity of 7 and more were 2.1 times (OR 2.1, 95%CI 1.31-3.04) more likely to get hepatitis B compared to mothers with gravidity between1-6. Moreover, only around one-third of (36.5%) of the interviewed women delivered at a hospital who were attended by qualified health professional while another third (34.6%) delivered at home by TBAs.

This study has found that the seroprevalence of HBsAg among pregnant women attending at SOS Mother and Child Hospital was 4.12%.

Recommendation

Ministry of Health Somalia, management of Hospitals, Health centers and MCHs should adopt a proper prevention and control intervention guidelines which consider the following points:

- Trainings and awareness sessions on Hepatitis B risk behaviors and transmission for workers and community should be maintained
- Health workers at hospitals be offered Hepatitis B vaccinations
- Universal screening of all pregnant women for HBsAg during each pregnancy
- Case management of HBsAg-positive mothers and their infants
- Provision of immunoprophylaxis for infants born to infected mothers, including hepatitis B vaccine and hepatitis B immune globulin

- Routine vaccination of all infants with the hepatitis B vaccine series, with the first dose administered at birth
- Further study needs to be conducted to examine the possibility and extent of co-infection on large scale throughout the nation.

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