



## RESEARCH ARTICLE

### SYMPTOMATIC CHRONIC HEPATITIS B INFECTION IN PREGNANCY A HIGH RISK FOR ADVERSE OBSTETRIC AND PERINATAL OUTCOME

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#### ARTICLE INFO

##### Article History:

Received 24<sup>th</sup> March, 2016

Received in revised form

10<sup>th</sup> April, 2016

Accepted 05<sup>th</sup> May, 2016

Published online 30<sup>th</sup> June, 2016

##### Key words:

Symptomatic,  
Chronic hepatitis,  
Obstetric,  
Perinatal,  
Adverse outcomes.

#### ABSTRACT

Both symptomatic and asymptomatic chronic Hepatitis B viral infections in pregnancy have been found to be associated with adverse pregnancy outcome for the mother and the baby. This comparative study compared maternal and perinatal outcomes of pregnancy between mothers with symptomatic HBV infection and those who were asymptomatic. The results revealed that HBV infected pregnant women with low income, low educational level and are rural dwellers are more likely to be symptomatic. There was statistically significant difference in maternal outcomes (parity, premature rupture of membrane, foul smelling liquor, history of abortion and STI/UTI) between symptomatic and asymptomatic HBV infected mothers. A positive association exists between symptomatic HBV infection and gestational age ( $P < 0.001$ ), birth weight ( $p < 0.001$ ), Apgar score at minute one (0.001), Apgar score at minute five ( $p < 0.001$ ), stillbirth (0.001) and asphyxia ( $P < 0.001$ ). Antenatal care services must target screening and effective management of HBV infected individuals to reduce the adverse maternal and perinatal outcomes.

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Citation: MateSiakwa, Alex Boye, Wisdom Azanu, et al. 2016. "Symptomatic chronic hepatitis b infection in pregnancy a high risk for adverse obstetric and perinatal outcome", *International Journal of Current Research*, 8, (06), 33421-33424.

## INTRODUCTION

Chronic Hepatitis B viral (HBV) infection is endemic the world over and in Ghana most of the chronic infections are asymptomatic. Majority of infected individuals are at the prime of their lives and within the childbearing age group (Cho et al., 2012; El-Shabbrawi et al., 2013; Esan et al., 2014). Such individuals are likely to pass the infection to their children or may suffer adverse pregnancy outcomes (Gambarin-Gelwan et al., 2007; Elefsiniotis et al., 2010; Safir et al., 2010; Nooritajer, 2011; Borgia et al., 2012; Siakwa et al., 2014). Whether symptomatic or asymptomatic, chronic HBV infections have adverse effect on both maternal and perinatal

outcome (Siakwa et al., 2014). Maternal outcomes reported to be associated with HBV infection are Chorio-amnionitis and premature rupture of membrane (PROM) (Vanodkumar et al., Giogiana et al., 2010; West and Tabansi, 2012; Siakwa et al., 2014). HBV infection was also found to increase the risk for urinary tract infection as well as sexually transmitted infection both known to have adverse effect on obstetric and neonatal outcomes (Webb and Bain 2011; West and Tabansi, 2012). Well documented perinatal outcomes of HBV infection in pregnancy include preterm delivery, low birth weight, low APGAR score at minute one and five, asphyxiated babies and high still birth rate (Lao et al., 2012; Siakwa et al., 2014). The biological explanation to the possible mechanism underlining the relationship between HBV infection and pregnancy outcomes are not convincing. However, Luppi et al., (2002) believes that the increase in pro inflammatory cytokines associated with chronic HBV infection in pregnancy may be

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responsible for the heightened adverse outcomes observed in positive HBsAg mothers. Effective antenatal and postnatal care is known to reduce adverse obstetric and perinatal outcome in HBV infected pregnant women (Fomulu *et al.*, 2013). This follow up study compared maternal and perinatal outcomes of symptomatic and asymptomatic HBV infected pregnant women.

### Recruitment of Patients

Two hundred and sixty two (262) pregnant women who were positive for hepatitis Bin a previous study (Siakwa *et al.*, 2014) were enrolled in the study to determine differences in maternal and perinatal outcomes between those with asymptomatic HBV infection (170) and those who were symptomatic (92). Participants gave their consent in writing and were screened for any underlying obstetric and medical complications for exclusion.

**Table 1. Socio-demographic Characteristics of Respondents**

Parameters	Variables	Case (n=92)	Control (n=170)	$\chi^2$	p-value
Age	<20	4	7	7.5115	0.05726
	20 – 29	59	100		
	30 – 39	21	50		
	≥ 40	18	13		
Income	Low	40	104	12.4465	0.001983
	Medium	28	48		
	High	24	18		
Educational Level	Illiterate	10	27	25.8818	0.00001
	Primary	20	91		
	Secondary	42	40		
	Tertiary	10	12		
Residence	Rural	62	92	3.8103	0.05094

**Table 2. Maternal Obstetric Characteristics of Respondents**

Parameters	Variables	Case (n=92)	Control (n=170)	$\chi^2$	P-Values
Parity	1	45	100	8.9796	0.01122
	2	32	61		
	≥ 3	15	9		
PROM	Present	59	25	64.6961	0.0000
	Absent	33	145		
PIH	Present	32	39	3.6588	0.05577
	Absent	60	131		
Foul Smelling Liquor	Present	27	5	36.399	0.0000
	Absent	65	165		
Previous Abortion	Present	33	10	36.9736	0.0000
	Absent	59	160		
HO/UTI/STI	Present	51	16	64.0362	0.0000
	Absent	41	154		

**Table 3. Neonatal Characteristics of Infants Born to Respondents**

Parameters	Variables	Case (n=92)	Control (n=170)	Chi Square	P-Values
Gestational Age	Preterm	52	10	81.9607	0.0000
	Term	40	160		
Birth Weight	<2500g	49	17	57.0094	0.0000
	≥2500g	43	153		
Apgar Score at 1 min	< 7	62	35	54.0936	0.0000
	≥ 7	30	135		
Apgar Score at 5 min	< 7	38	30	16.1751	0.00006
	≥ 7	54	140		
Birth Outcome	Live	82	169	13.2361	0.00027
	Still Birth	10	1		
Asphyxia	Present	23	5	28.1647	0.0000
	Absent	69	165		

## PATIENTS AND METHODS

This descriptive comparative study was conducted in the Cape Coast Teaching Hospital, the major tertiary health institution in the Central Region of Ghana. The Institutional Review Board of the University of Cape Coast approved the study.

Participants were categorized into symptomatic and asymptomatic on the basis of results of Alanine amino transferase (ALT), aspartate amino transferase (AST), alkaline phosphatase 5' nucleotidase, Gamma-glutamyltranspeptidase (GGT), Bilirubin level and total serum protein. Clinical features indicative of impaired liver function were also

screened for. Socio-demographic, medical and obstetrical data were collected using a pre-tested checklist. Participants were monitored on each antenatal visit through their pregnancy until delivery and their babies were assessed for Apgar score at minute one and five, birth weight, prematurity and any abnormalities.

### Data Analysis

Data were entered into the computer using SPSS for windows (version 22.0) and double checked before analysis. Means and proportions of the socio-demographic, medical, obstetrical and neonatal characteristics were calculated and compared between symptomatic and asymptomatic groups using the student t-test and Chi-square test. Multivariate analysis was done with symptomatic/asymptomatic as dependent variables and socio-demographic, medical, obstetrics and neonatal variables as independent variables. Differences between means were considered statistically significant at  $p < 0.05$ .

The respondents comprised of 262 HBV infected mothers and their respective babies. Table 1 shows the distribution of the demographic characteristics of cases and controls. There is no statistically significant difference between the symptomatic and the asymptomatic groups in terms of their age ( $p=0.057$ ). However, there were statistically significant differences in terms of income level ( $p=0.0019$ ), educational level ( $P<0.001$ ), place of residence, ( $P=0.050$ ). Table 2 presents the maternal obstetric characteristics. There were statistically significant differences between pregnant women who were symptomatic for HBV infection and those who are asymptomatic in terms of parity ( $p=0.011$ ), PROM ( $P<0.001$ ) foul smelling liquor ( $p<0.001$ ) previous abortion ( $p<0.001$ ) history of UTI/STI ( $p<0.001$ ). Mothers with symptomatic HBV infection were more likely to have PROM and FSL than those who are asymptomatic.

Furthermore, mothers with symptomatic HBV infection are more likely to have a history of UTI/STI and previous abortion than their asymptomatic counterparts. Whereas pregnancy induced hypertension was found not to be associated with the presence or absence of symptoms in HBV infection. Table 3 shows neonatal outcomes of mothers with symptomatic HBV infection and those who were asymptomatic. The difference in the distribution of their gestational age, birth weight, Apgar Score at minute one and five, birth outcome and asphyxia is shown by chi square analysis. The results of the chi squared analyses revealed significant differences in gestational age ( $P<0.001$ ) birth weight ( $p<0.001$ ), Apgar score at minute one ( $0.001$ ) Apgar score at minute five ( $p<0.001$ ), stillbirth ( $0.001$ ) and asphyxia ( $P<0.001$ ). Mothers with symptomatic HBV infection were more likely to have adverse birth outcome than those who are asymptomatic.

## DISCUSSION

The study compared obstetric and neonatal outcomes among 262 mothers with HBV infection; Ninety-two (92) symptomatic as cases and One hundred and seventy (170) asymptomatic as control.

The majority of the respondents were aged 20-29 years, were rural dwellers, belong to the low to middle income group with low educational level. Being symptomatic was associated with the respondents' educational or income levels. Similar findings were reported earlier (El-shabrawi *et al.*, 2013; Esan *et al.*, 2014). Women who live in rural settings and are of lower income status are more likely to engage in risky behaviors that will expose them to the infection. Sharma *et al.*, (1996) and Chandan *et al.* (2012) also asserted women in rural settings with low educational background had insufficient knowledge regarding HBV infection and its mode of transmission. Untreated asymptomatic HBV infection in pregnancy can lead to chronic symptomatic infection with devastating maternal and neonatal effect. In our earlier study we reported a significant positive relationship between a positive HBsAg and PROM and FSL (Siakwa *et al.*, 2014). The present study identified a significant association between symptomatic HBV infection and PROM and FSL. Other earlier studies have reported PROM (Vinodkumar *et al.*, 2009; Giogiana *et al.*, 2010; West and Tahansi., 2012) maternal UTI/STI (Web and Bain, 2011) and FSL (Shah *et al.*, 2006; West and Tahansi, 2012) as a risk factor for neonatal sepsis. The present study also noted that being symptomatic for HBV infection is associated with maternal UTI/STI and previous abortion. We reported earlier that STI/UTI are risk factors for neonatal sepsis, an indication of increased vertical transmission (Siakwa *et al.*, 2014). Luppi *et al.*, (2002) reported that increased pro inflammatory cytokines associated with chronic hepatitis B infection in pregnancy might be responsible for the heightened adverse outcomes observed in positive HBsAg mothers. Several studies have shown HBV infection in pregnancy have detrimental effect on perinatal outcomes ((Chang, 2000; Fraser *et al.*, 2003; Won *et al.*, 2006; Siakwa *et al.*, 2014). Notable adverse outcomes of HBV infection are Low birth weight, preterm delivery, low APGAR score at minute one and five and asphyxia (Tse *et al.*, 2005; Nithin *et al.*, 2009; Lobstein *et al.*, 2011; Lao *et al.*, 2012; Siakwa *et al.*, 2014). The present study established that pregnant women who are symptomatic for HBV infection are at a higher risk for having neonates with low birth weight, preterm delivery, low APGAR score at minute one and five and asphyxia than those who are asymptomatic. Asymptomatic HBV infection when not managed properly could progress to symptomatic infections as a result of increased viral load and deteriorated immune function which is an increased risk for vertical transmission and adverse pregnancy outcome.

## Conclusion

HBV infections in pregnancy, whether symptomatic or asymptomatic have adverse effect on maternal and perinatal outcomes. The risk of adverse maternal and neonatal outcomes are higher in symptomatic than asymptomatic individuals. Management of pregnant HBV infected women in antenatal care must aim at reducing disease progression and the consequential adverse pregnancy outcomes.

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