

# Factors Associated with Prevalence of Hepatitis B among Pregnant Women in Bor South County

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**Abstract:** *Objective:* To determine factors associated with prevalence of hepatitis B among pregnant women in Bor South County, Jonglei state, South Sudan. *Methods:* Cross-sectional study, that was quantitative study using structured questionnaires, focus groups discussions (qualitative study) and observational study to determine factors associated with prevalence of Hepatitis B among pregnant women attending antenatal service at Bor Hospital from 1<sup>st</sup> of June-31<sup>st</sup> of July 2023. Laboratory detection of hepatitis B virus; Hepatitis B surface antigen (HBsAg) and antibody (Anti-HBs, Anti-HBc IgG and Anti-HBc IgM) assays was done using the Abbot Murex enzyme immune-assay kits. *Setting:* Bor Hospital. *Primary outcome:* Hepatitis B surface antigen (HBsAg) positivity.

**Keywords:** Prevalence of Hepatitis B, pregnant women, risk factors and Bor South County

## 1. Results

The study enrolled 180 pregnant women attending antenatal clinic in Bor Hospital. Their age ranged between 15 and 49 years. The youngest participant was 15 years and the oldest was 49 years. Age group 15-29 years had the highest number of participants (n=95, 53%), followed by 30-39 years (n= 82, 46%). The older group 40-49 years was the least (n= 3, 1%) The majority of study participants were 1st to 4th pregnancy. The majority (69.3%) of study participants had primary or no education at all. Nearly a quarter of the study participants had no education at all. The participants with the post-secondary education were the minority (6.4%). The majority of the study participants (65%) did not have history of surgical intervention while only 32.5% had surgical history. When asked about history of blood transfusion, a majority of study participants (95.4%) had not and only 4.6% had history of blood transfusion. Majority of the study participants (74%) were married women, 15% were separated/divorced, 3% were single and 8% of the study participants were widow.

## 2. Conclusion

The study results were cross tabulated for bivariate analysis and showed that the risk of Hepatitis B infection was significantly associated with a) loss of marital partner (odds ratio of 4 in a 95% confidence interval of 1.39 to 13.92) and b) history of jaundice (odds ratio of 1.69 in a 95% confidence interval of 1.21-2.14). Other risk factors studied were not significantly associated with positive Hepatitis B infection rates.

## 3. Statement of the Problem

In South Sudan the prevalence of HBsAg was previously estimated to be 26%. When mother to child transmission of HBV infection was studied in Juba, South Sudan, five out of nine (55.5%) babies born to HBsAg positive mothers were infected, documenting the high-risk of infection in early childhood. Even in countries with developed health care systems, screening women for high-risk groups failed to identify 35%-65% of HBsAg positive pregnant women as a result, it is recommended that all pregnant women should be

screened for HBsAg, a practice that may not be feasible in developing health systems context.

From the public health perspective, preventing HBV infections acquired at birth and in early childhood is critical, as children have a 90% chance of becoming chronic carriers if infected at the time of birth, a 30% chance of becoming chronic carriers if infected between one and five years of age, and a 5% to 10% chance of becoming chronic carriers if infected after five years of age. HBV transmission can be prevented by vaccination of at risk-infants. In the absence of a health care system that can effectively screen for HBsAg infections in pregnant mothers, it would make public health sense (Population approach) to introduce hepatitis B vaccination into childhood immunization programs that includes administration of a birth dose.

## 4. Study design

The study design was a cross-sectional study, that was quantitative study using structured questionnaires, focus groups discussions (qualitative study) and observational study to determine factors associated with prevalence of Hepatitis B among pregnant women attending antenatal service at Bor Hospital from 1<sup>st</sup> of June-31<sup>st</sup> of July 2023. Laboratory detection of hepatitis B virus; Hepatitis B surface antigen (HBsAg) and antibody (Anti-HBs, Anti-HBc IgG and Anti-HBc IgM) assays was done using the Abbot Murex enzyme immune-assay kits. The units of analysis for this study was pregnant women who come for antenatal care service at Bor hospital in Bor South county.

### Sample size determination and selection

The sample size was calculated using single population proportion formula by assuming the lowest prevalence of HBV 5.6% and highest prevalence of 24%. Accordingly, a total of 180 study participants were enrolled. Probability sampling using the systematic method was used to recruit study participants. The sampling frame consisted of all pregnant women attending ANC at Bor hospital. The sampling interval (K unit) was calculated as 9 mothers using ANC records which showed a monthly attendance of 291 first visit attendance, with 60% of attendees being residents of the three Urban Payams of Bor South County. A random starting point was then selected. The random starting point

was any number < 10 and for this study the 1-9 registered woman was considered as the starting study participant. The subsequent study participant was determined by cumulatively adding the K unit.

### Quantitative results

The study enrolled 180 pregnant women attending antenatal clinic in Bor Hospital. Their age ranged between 15 and 49 years. The youngest participant was 15 years and the oldest was 49 years. Age group 15-29 years had the highest number of participants (n=95, 53%), followed by 30-39 years (n= 82, 46%). The older group 40-49 years was the least (n= 3, 1%). The majority of study participants were 1st to 4th pregnancy. The modal pregnancy was prime gravidae. The least number of participants was observed in the category of 7 or more pregnancies. The majority (69.3%) of study participants had primary or no education at all. Nearly a quarter of the study participants had no education at all. The participants with the post-secondary education were the minority (6.4%). The majority of the study participants (65%) did not have history of surgical intervention while only 32.5% had surgical history. When asked about history of blood transfusion, a majority of study participants (95.4%) had not and only 4.6% had history of blood transfusion. Majority of the study participants (74%) were married women, 15% were separated/divorced, 3% were single and 8% of the study participants were widow.

### Qualitative Results

Two FGDs were conducted involving a total of 20 participants, 10 in each group, with the age range of 15-49 years old and all were pregnant women who are residents of Bor South County for not less than 12 months, attending and using the antenatal services in Bor Hospital.

### Data Management

A structured questionnaire was prepared and translated into local languages (Dinka) prior to the start of the fieldwork. The questionnaire was uploaded into Kobo collect or server and download it later into tablets (mobile phones) for it uses for data collection, cross-checked, analyzed and kept in a safe place before data compilation/analysis.

### Data Analysis

Excel Version 16 and SPSS were used to cleaned and analyzed the data. Multivariate Analyses was carried out to elicited the impact of each factor on the pattern of factors associated with prevalence of hepatitis B among pregnant women in Bor South county.

## 5. Discussions

The study documents that 11.7% of pregnant women were positive for HBV surface antigen (HBsAg). This prevalence is much higher than earlier documented by Elsheikh, in his study of Hepatitis B and hepatitis C prevalence in pregnant Sudanese women in 2007, when South Sudan was still under Sudan. This statistic also confirms that HBV prevalence in South Sudan remains high, as was earlier reported by McCarthy MC et al in 1994. This re-affirms the conclusion that Sudan generated information should not be used in policy and programming for the newly formed Republic of South Sudan.

The prevalence of HBV estimated by this study compares very well with what was reported by Bayo P, et al in Northern Uganda. The near exact estimates of HBV prevalence in Northern Uganda and South Sudan is attributable to similarity in lifestyles, similar post-conflict study settings, similar study methods (participant selection from one referral and public hospital) and similar laboratory methods (using ELISA kits with similar sensitivity levels). The similarity in prevalence estimates suggests that data/evidence generated in Northern Uganda is a better guide to policy and programming in South Sudan.

I documented that only two out of the 10 factors I studied were significantly associated with positive HBsAg. The two factors were loss of a marital partner and history of Jaundice. I considered that loss of partner in the social-cultural context of South Sudan, exposes the women to multiple sexual partners. It's important to note that sexuality is not a freely discussed topic in South Sudan.

In the meantime, the association of history of jaundice with HBsAg suggests that pregnant mothers can positively identify yellowing of eyes associated with HBV infections. Therefore, history of jaundice could be an important variable for designing HBV birth-dose vaccination programs. In a resource constrained Public Health system of South Sudan, verbal screening of history of Jaundice could also be a simple tracer indicator for identifying mothers at high risk of vertical transmission of HBV. Such high-risk pregnant mothers could in turn be prioritized for birth dose vaccination using monovalent Hepatitis B vaccines.

## 6. Conclusion

The study results were cross tabulated for bivariate analysis and showed that the risk of Hepatitis B infection was significantly associated with a) loss of marital partner (odds ratio of 4 in a 95% confidence interval of 1.39 to 13.92) and b) history of jaundice (odds ratio of 1.69 in a 95% confidence interval of 1.21-2.14). Other risk factors studied were not significantly associated with positive Hepatitis B infection rates. These study findings suggest that only 30% of infants in Bor South county are born to immune mothers (naturally or vaccine induced). The remaining 70% of babies would be at high risk of infection, if a birth dose of Hepatitis B is not provided. I therefore recommended introduction of Hepatitis B Vaccine birth dose into routine infants' vaccination series to eliminate this risk.

## 7. Recommendations

- To screen every pregnant women attending antenatal care service for hepatitis B infections during ANC service, and verbal screening of history of Jaundice could also be a simple tracer indicator for identifying mothers at high risk of vertical transmission of HBV. Such high-risk pregnant mothers could in turn be prioritized for birth dose vaccination using monovalent Hepatitis B vaccines.
- The Republic of South Sudan, Ministry of health (MOH) to introduce Hepatitis B birth-dose vaccination of infants. The study confirms that there is a high-risk of vertical transmission of HBV infection to the unborn child in

South Sudan to justify a monovalent birth dose introduction.

- Policy makers and health planners need to recognize the factors associated with prevalence of Hepatitis B and maternal health care service use. More efforts should be given to educate mothers, to improve men involvement and religious leaders, to strengthen community participation, to increase political commitment and to boost accessibility to maternal health care services. Emphasis should also be given for capacity building for skilled birth attendants and community health workers.
- Traditional beliefs, religion beliefs and other harm full practices were negatively influencing the community and mothers on the selection of the health facility. Accordingly, efforts should be made to create awareness regarding the disadvantages of the traditional harm full practices through mobilizing the general public and involvement of elderly mothers and religious leaders.
- The Republic of South Sudan, Ministry of health (MOH) in collaboration with all health partners (WHO, UNICEF and other health partners) operating in the Country to sensitize the community about hepatitis B. What cause it and how to prevent it among the people in the community.

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