WHAT THE HEP IS GOING ON?!! PROTECTING FUTURE GENERATIONS: ADDRESSING HEPATITIS B AMONG PREGNANT WOMEN AND NEWBORNS IN ZAMBIA

Perspective

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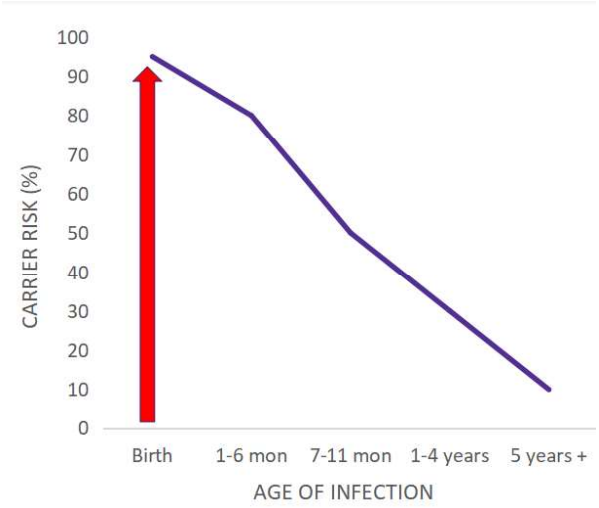
Key Messages

- *Hepatitis B virus (HBV) mother to child transmission (MTCT) accounts for one-third of the global hepatitis HBV burden*
- *Pregnant HBV infected woman have a 70-90% increased risk of transmitting HBV to their newborn*
- *90% of infected newborns develop chronic hepatitis B*
- *A birth HBV immunisation introduced in Zambia is estimated to reduce HBV MTCT infection by 80%*

Problem Statement

Hepatitis B is a viral disease caused by the hepatitis B virus (HBV). Common modes of transmission include: mother to child transmission (MTCT), contact with infected blood and body fluids, and sexual transmission. According to the 2016 Zambia Population HIV Impact Assessment, 3.5% of the population is infected with HBV[1]. An estimated 208,000 children aged 0-9 years are HBV infected. Approximately 56,000 pregnant women are living with HBV[2] (about 6.5% of pregnant women), although most do not know there HBV status due irregular screening. Perinatal transmission from mother to infant at birth is very high with 70-90% of infants becoming infected in the absence of post exposure prophylaxis]3]. Furthermore, infections acquired in infancy through perinatal or early childhood exposure are 90% more likely to become chronic than infections acquired later in life as seen in Figure 12.

Zambia also performs irregular HBV screening, thus Zambian women who are HBV infected and unaware of their status are at an increased of HBV MTCT[4]. However, studies have shown that treatment of HBV positive women with tenofovir, used in ART treatment, reduces MTCT to less than 2%6,[5]. As an unintended positive consequence, women who are coinfected with HIV/HBV and on ART are at a lesser risk of HBV MTCT8.



The country has been aware of the dangers associated with HBV infection for decades, hence the introduction of HBV vaccination as part of routine childhood immunisation program in 2005. Despite these efforts, the risk for HBV MTCT is still high as vaccine is given beginning at 6 weeks, leaving infants younger than 6 weeks at an increased risk for HBV seroconversion. Studies have shown that an HBV immunisation given within 24 hours of birth reduces HBV infection by 85%[2].

Policy Rational

1.In Zambia, one reason for the higher risk of chronic HBV is due to irregular testing and treatment of HBV infected pregnant women and the lack of the HBV birth dose immunisation[7].

Considering the research showing the reduction of HBV MTCT from pre-birth prophylaxis of tenofovir to the infected mother and HBV immunisation of newborns, we are proposing four policy options:

(2) introduce HBV screening and HBV treatment for HBV infected pregnant women; (3) introduce a birth HBV vaccination to newborns; and (4) the combination of HBV screening and HBV treatment for HBV infected mothers and birth HBV vaccination for newborns. This analysis is done assuming a healthcare facility that sees 36,000 births per year.

Policy Options

1. Currently, there is no vaccination at birth, no screening for HBV infected women, and no treatment for HBV infected pregnant women. Studies conducted in Malawi and South Africa showed a 10% infection rate among infants born from HIV/HBV co-infected mothers, which our model coming close to what we would expect in Zambia at 9.1%. This estimate is close to another Zambian estimate[8].
2. Introduce HBV screening and treatment for HBV positive pregnant women (Treat Only)
WHAT: HBV screening and treatment for HBV positive women
WHY: In addition to the current routine ANC screening for HIV and syphilis, add HBV screening and giving tenofovir to

HBV positive pregnant women from 28-32 weeks of pregnancy to reduce HBV viral load and reduce the risk of transmission by up to 40%. If implement in Zambia, this could reduce the percentage of children infected to 7.7% at a cost of $4,222 per HBV infected child adverted.

FEASIBILITY: Low to medium. This option builds on the Ministry of Health (MOH) strategic plan to eliminate MTCT of HIV and HBV infection in the population by 2030. Implementation will require training of staff and community sensitization on HBV screening during antenatal visits.

3.Introduce a birth HBV vaccination to newborns (Vaccinate only)

WHAT: HBV vaccination for the newborn regardless of the mothers HBV status

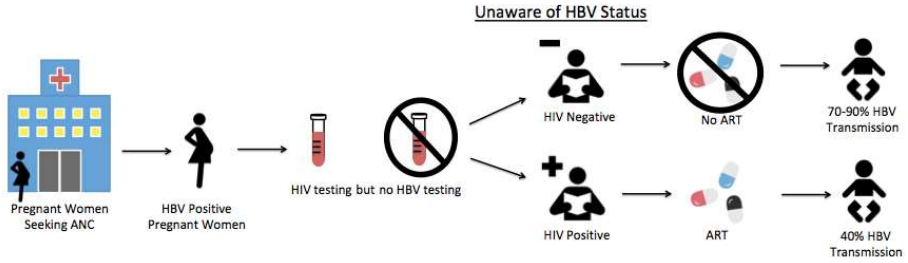
WHY: Currently, HBV vaccination starts at 6 weeks meaning that babies remain at high risk for HBV infection during the first 6 weeks of life. If an HBV vaccine is given at birth, we estimate that this would reduce the percentage of HBV positive children down to 1.8% at a cost of $236 per HBV infected child adverted.

FEASIBILITY: Medium to high. This option also builds on the MOH strategic plan as stated above. Implementation will require training of staff and community sensitization in order to achieve maximum coverage as for other vaccines such as BCG and OPV. It will also require an additional budget of about $0.6 million for one health facility.

4.Combination of HBV screening and HBV treatment for HBV infected mothers and birth HBV vaccination for newborns Introduce HBV screening, treatment for HBV infected pregnant women, and HBV birth vaccination for the newborn (Option 2 and 3 combined)

WHAT: In addition to routine ANC screening for HIV and syphilis, add HBV screening and giving tenofovir treatment to HBV positive pregnant women from 28-32 weeks of pregnancy to reduce HBV viral load, combined with HBV vaccination for the newborn.

WHY: Most pregnant women are unaware of their HBV status. Furthermore, only the HIV/HBV co-infected pregnant women benefit from tenofovir, which leaves women who are HIV negative but HBV positive at risk of spreading infection to the newborn and possibly to their partners. Screening will identify these women and treatment can be provided. Vaccination will add additional protecting to the newborn. We estimate that this policy option would reduce the percentage of HBV infected children to 1.5%, at a cost of $923 per infected child averted.



FEASIBILITY: Medium to high. This option builds on the MOH strategic plan to eliminate HBV infection in the population, but it is estimated to cost and additional $2.5 million for one health facility.

Summary of Policy Options (For a healthcare facility that sees 36,000 births per year)	Option 1 Status Quo	Option 2 Treat Only	Option 3 Vaccinate Only	Option 4 Option 2 and 3 Combined
Percentage of newborns infected	9.10	7.67	1.75	1.48
Cost per pregnant woman/newborn (USD)	-	$60.65	$17.37	$70.41
Total cases of infected newborn	3,277	2,759	631	531
Percent decrease in infections vs option 1		1.44	7.35	7.63
Number of cases prevented vs option 1		517	2,646	2,745
Program cost (USD)		$2,183,215	$625,304	$2,534,708
CE ratio vs option 1 (USD per infected newborn prevented)		$4,222	$236	$923

Recommendations and next steps

Option 3 offers the highest health benefit given the additional money spent to implement the strategy. Additionally, Option 4 can be considered for the benefit it offers to reduce transmission to the newborn and potentially to sexual partners, and possible curing the mother. These analyses do not take into consideration the long-term benefit: reducing expensive health cost and major health issues in the future year due to liver cancer, jaundice, and death. For example, treating someone today for liver cancer is $30,000. Costs are likely to be higher in the future.

Implementation of these options will entail an estimated first year spending the following at national level: Option 2: $38,607,364; option 3; $11,057,047; Option 4: $44,839,286. The following are also needed:

- Raised communication awareness about HBV
- Training of health workers on HBV screening and treatment guidelines.
- Introduction of mono-dose at birth vaccine into the current immunisation schedule
- Ensure logistics can accommodate the additional ART and vaccine requirement

Without the introduction of these options, we can expect to see up to as many as 9% of newborns infected with HBV and the government would have to pay for the negative health outcomes in the future.

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