

# Hepatitis B infection among indigenous people in Nepal: looking through an equity lens

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**Aims:** Disparity in health care service and disease prevalence are global issues. Hepatitis B infection is a global public health problem; its prevalence is ubiquitous and heterogeneous.

This article reviews the situation and an impact of hepatitis B infection in the indigenous people in Nepal through the lens of equity perspective.

**Methods:** Literature search and collection of information from different sources.

**Results:** Hepatitis B prevalence is low (0.9%) at the country level in Nepal but higher, up to 38%, among the indigenous population compared to the national prevalence. Those who live in the high endemic areas are at risk of getting the infection from both vertical and horizontal mode of transmission. The unvaccinated cohort of infant (0-11 months) between 2003 and 2016 has swollen, 2764362 in number or 29 % of the total cohort. The National Immunization Program (NIP) administered hepatitis B vaccination at 6 weeks of birth, considering the low prevalence at the national level. The NIP does not prevent perinatal transmission of the infection. The mother to child transmission of the infection often leads to chronic liver diseases and about 20–30% of adults who are chronically infected will develop cirrhosis and/or liver cancer. The indigenous populations are thus disproportionately affected by the infection.

**Conclusions:** The policy update is required to implement the hepatitis B vaccination at birth or within 24 hours in high endemic setting along with a comprehensive package to reduce the disparity, prevent the transmission, risk of chronic infection and its sequelae to achieve the national goal and international commitment on the sustainable development goal by 2030.

**Keywords:** equity; hepatitis b; indigenous people; mountain; Nepal

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## INTRODUCTION

Hepatitis B infection is a global public health problem. An estimated 257 million people are living with chronic hepatitis B infection that is 3.5% of the global population, and mortality caused by viral hepatitis on the rise.<sup>1</sup> The hepatitis B surface antigen (HBsAg) seroprevalence of  $\geq 8\%$  defines high endemic areas, prevalence of 5%–7% defines high intermediate, 2%–4% low intermediate, and  $< 2\%$  defines low endemic areas.<sup>2,3</sup> Hepatitis B was also used to be known as the “Australian Antigen” as it was discovered in Australian aboriginal people in 1960s. An universal infant hepatitis B immunization program was introduced nationally in 2000.<sup>4</sup> Still, a significant health disparity persists between indigenous and non-indigenous population in Australians,<sup>5</sup> the

acute infection rates per 100000 populations for all ages were 3.6 and 1.1 for indigenous and non-indigenous people respectively between 2005 and 2015.<sup>4</sup> Likewise, the infection is widely prevalent among racial and ethnic minorities in the United States.<sup>6,7</sup> Similarly, pockets of higher endemicity are also found in tribal areas of India.<sup>8</sup> The infection varies considerably among the WHO Regions, with the highest in the African (6.1%) and Western Pacific Regions (6.2%), and among countries ranged from 0.20% (Mexico) to 22.38% (South Sudan).<sup>9</sup> All these facts conclude that the prevalence of the infection is ubiquitous and heterogeneous, it appears as a global phenomenon and indigenous ethnic populations are disproportionately infected. Thus, WHO has also considered indigenous population as a special community for the management of hepatitis B infection.<sup>3</sup>

In Nepal, the prevalence of the hepatitis B infection is considered low (0.9%).<sup>10</sup> A national survey conducted in pre and post vaccinated-children has revealed that the prevalence of the infection among the children is

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0.3 and 0.1 percentage, respectively.<sup>11</sup> An estimate with a systemic review of the published data between 1965 and 2013 estimated 218943 HBsAg-positive population in Nepal, and country prevalence is low, 0.82% (0.80-0.84).<sup>9</sup> Other key population have low to high intermediate prevalence, i.e., the sero-prevalence is a low among HBV in Blood donors (0.35%-1.2%) and ante-natal mothers (0.5%);<sup>12</sup> and an intermediate among Injecting Drug Users (5.5%),<sup>13</sup> and people living with HIV/AIDS (4.4%).<sup>14</sup>

In contrast, a various contextual studies have shown that the prevalence of hepatitis B infection is high among the indigenous people. This article reviews the situation and future impact of hepatitis B infection and its sequelae in the indigenous peoples in Nepal through the lens of equity perspective.

## METHODS

The literature searches were carried out in PubMed, Google scholar and search, and other relevant websites using the words; “hepatitis b”, “indigenous people”, “ethnic community”, and Nepal”. Relevant references were compiled in the EndNote X7.0.1 [Bld 7212] software, @ 1988-2013 Thomson Reuters. Due to the paucity of data and information related in the subject matter, the review has to be relied on various sources such as the Google search, and grey articles. The ethical approval was not required as this study is based on publicly available secondary data and information that already have taken consent or based on de-identify and aggregated population based information.

## RESULTS

### The prevalence of the infection and risk factors

The search was done with PubMed using the key words “hepatitis b and indigenous”, 193 articles were found, then the search was done with the words “hepatitis B” and indigenous and Nepal”, only one article was found,<sup>15</sup> which has suggested high prevalence of hepatitis B infection among mother (17%) and children living with hepatitis B infected mothers (48%). The search with the words “hepatitis B and ethnic group”, 1138 articles were found; again search with the words "hepatitis B and ethnic group and Nepal”, one article was found that suggested some ethnic groups and geographic areas have higher prevalence (3.5-7.5%) rate of hepatitis B infection.<sup>16,20,21</sup>

The literature searches were also carried out in Google scholar with the words: “hepatitis B and

indigenous”, 10 results were found. Then search with the words; "hepatitis B" and indigenous in Nepal; one article was found that suggested high prevalence of the infection.<sup>15</sup> The gray literatures were also searched.

A study among mothers and under 5-year children has revealed the high prevalence of the infection among indigenous peoples in upper mountain region, i.e., 17% (95% CI, 11.01–22.99%) mothers and 48% children (95%CI, 28.42–67.58%) living with hepatitis B positive mother were infected. Among the infected mothers, 40% were hepatitis B envelope antigen (HBeAg) positive, higher prevalence of HBsAg among the children living with HBeAg positive mothers compared to HBeAg negative one (60% vs. 40%), and male children compare to female (60 % vs. 33%). Furthermore, only 36% of children were vaccinated with the third dose vaccination, among the vaccinated children 56 % were HBsAg positive.<sup>15</sup>

Likewise, a study conducted among seasonal migrants from indigenous community during the winter season from upper part of the Dolpa to Kathmandu, in 2006, had shown high prevalence of the infection, i.e., about 38%. A risk behavior were highly prevalent among the migrants; only 45% heard about the condom, overwhelming did not use condom (92%) , only few people (1.5%) used condom to protect STI. The consistence use of condom was absolutely non-existent, and early marriage at the age of 9 to 19 was rampant (82%). About 97% males and 50% female used alcohol either daily or at least once a week.<sup>17</sup>

Some other reports have also mimicked the previous findings; reports of winter clinic conducted by the Dolpa Tulku Charitable Foundation, among migrant from upper part of the Dolpa to Boudha Kathmandu, showed that about 18% migrants in 2012 and 14% in 2014 were HBsAg positive.<sup>18,19</sup> Other studies among the ethnic groups have also suggested the high prevalence of the infection as compare to the general population (0.9%), such as Gurung from Manang (7.3%) and Sherpa from Solukhumbu area (3.5%) in Nepal.<sup>20,21</sup>

A study conducted among pregnant women (N=16400) in Paropakar Maternity and Women Hospital revealed that the hospital prevalence of the infection among the pregnant was low (0.32 %). The prevalence of the infection among the Janajati was 0.5% and other than Janajati was 0.2%. The infection rate was significantly high among the Janajati (Pearson

Chi-Square 11.788,  $p=0.001$ ). The unadjusted odds of the infection among the Janajati with reference to other than Janajati was 2.596 (1.475-4.569),  $p=0.001$ . The overwhelming number of participants were unaware of the infection (84.4%), less than one-fifths had heard of the infection (15.6%), and a very few were informed about their status (3.1%) (unpublished study).

The indigenous people who live in the areas were deprived of adequate modern health care services and compounded by a poor universal precaution.<sup>22</sup> Alcohol consumption in the indigenous communities is at epidemic rates.<sup>15,17,23</sup> They have their own health care system such as local doctors (Amchi) are providing various surgical procedures without proper sterilization, cultural practices of polyandry or polygamy, making lukewarm food into the mouth or pre-mastication of food and feeding the baby, lack of awareness, unavailability of condoms, and other unsafe practices such as tattooing, piercing without sterilization and using common razors are putting

the people at risk of the infection.<sup>15,17,24</sup> With these findings, we can conclude that the risk factors and prevalence of the infection are clustered in some ethnic indigenous population in Nepal.

### Hepatitis B infection and sequelae

The persons with chronic hepatitis B infection are at risk for serious illness and death, about 20–30% of adults who are chronically infected will develop cirrhosis and/or liver cancer.<sup>2,3</sup> These facts indicate the gravity of the problem among the indigenous community. A various studies have shown that jaundice and liver cancer is increasing in the indigenous community; the Nepal Living Standards Survey (NLSS), a national representative survey conducted by the Central Bureau of Statistics (CBS), has revealed the burdens of illness (liver) are disproportionately high among indigenous peoples, and hindering their economic advancement.<sup>25</sup> However, there is no hepatitis B specific surveillance, notification, and registration system in Nepal.

**Table-1: WHO vaccine-preventable diseases: monitoring system. 2017 global summary, WHO UNICEF estimates time series for Nepal (Last updated 28-Feb-2018)**

| Year                               | 2003 to 2016 |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|------------------------------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                    | 2003         | 2004      | 2005      | 2006      | 2007      | 2008      | 2009      | 2010      | 2011      | 2012      | 2013      | 2014      | 2015      | 2016      |           |
| Targeted (0-11 months)*            | 9,687,188    | 7,543,919 | 6,660,629 | 6,008,802 | 6,302,499 | 6,302,499 | 6,590,016 | 6,566,339 | 7,549,987 | 7,516,620 | 7,480,074 | 7,421,164 | 7,353,339 | 7,288,858 | 7,566,943 |
| HepB3 coverage (%)                 | -            | 87        | 91        | 92        | 92        | 90        | 92        | 82        | 89        | 82        | 82        | 69        | 41        | 27        | 2         |
| Vaccinated (n)                     | 6,922,826    | 5,428,810 | 6,011,172 | 5,600,998 | 5,799,829 | 5,672,224 | 6,062,295 | 5,381,198 | 6,719,938 | 6,163,328 | 6,134,421 | 5,120,093 | 3,014,489 | 1,966,792 | 15,139    |
| Unvaccinated (n)                   | 2,764,362    | 81,109    | 59,457    | 48,704    | 50,420    | 63,025    | 52,721    | 118,141   | 83,049    | 135,292   | 134,653   | 230,071   | 433,850   | 532,066   | 741,804   |
| Cumulative unvaccinated cohort     | 2,764,362    | 2,764,362 | 2,683,253 | 2,623,796 | 2,575,092 | 2,524,672 | 2,461,647 | 2,408,926 | 2,290,785 | 2,207,736 | 2,072,445 | 1,937,791 | 1,707,720 | 1,273,870 | -         |
| Cumulative unvaccinated cohort (%) | 29           | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         | -         |

\*MOHP/DoHS targeted (0-11 months) population, Nepal

### Program perspective

In 2002, Nepal introduced single antigen hepatitis B vaccine in a phased manner, since 2004 the single antigen vaccine was replaced with a tetravalent vaccine (DPT-HepB). From 2009, hepatitis B vaccine has been administered as a pentavalent (DPT-HepB-Hib) vaccine to all infant at 6 weeks, 10 weeks and 14 weeks.<sup>26</sup> In 2016, national coverage with the third dose of hepatitis B vaccine reached 87%, but there are coverage gaps between the provinces [Province-1 (85.6%), Province-2 (76.1 %), Province-3 (90.4 %), Province-4 (94.7 %), Province-5 (89.1%), Province-6 (83.3%), and Province-7 (92.7%)]. However, a context specific study has shown that a very low coverage (36%) of third dose hepatitis B vaccine among indigenous children under 5-year in a mountain region.<sup>15</sup> The birth dose of infant hepatitis B vaccine has not surveyed in the National Demographic Health Surveys as at birth dose vaccine not yet administered in Nepal,<sup>26</sup> whereas, the global coverage with birth dose of hepatitis B vaccine was 39% in 2015 (baseline), and it has targets to reach 50% in 2020, and 90% in 2030.<sup>27</sup>

Furthermore, in Nepal, the unvaccinated cohort of infant (0-11 months) between 2003 and 2016 has swollen, 2764362 in number, which is 29 % of the total cohort [Table-1]. Obviously, those who live in the high endemic areas are at risk of getting the infection from both vertical and horizontal mode of transmission, as the policy is silence about the catch-up vaccination program for the risk population. Categorically, the unimmunized children and adolescents in the endemic areas are at high risk. However, those who are susceptible to the infection, the vaccination could avert future morbidity and deaths.

The birth dose of hepatitis B vaccine remains the cornerstone of prevention for mother-to-child transmission of the virus, especially for high endemic areas.<sup>2,28</sup> The first dose of hepatitis B vaccine (timely birth dose) prevents the establishment of the infection to newborn that already exposed, as a post-exposure prophylaxis, and the efficacy in preventing mother-to-child transmission ranges from 80 to 95% with sustained high coverage three dose vaccines.<sup>29</sup> However, the efficacy declines with increasing intervals between birth and the administration of the vaccine.<sup>30</sup> In Nepal, the proportion of women with a postnatal check within 2 days increased from 45%

in 2011 to 57 % in 2016.<sup>31</sup> The birth dose could be administered with maternal health care services, and proceed to easy to difficult-from institution to home delivery as a recommended pragmatic strategy.<sup>30</sup>

Infants can acquire the infection from their untreated HBV infected mothers mostly during the birth. The mother to child transmission of the infection often leads to chronic liver diseases.<sup>3</sup> Use of hepatitis B immunoglobulin (HBIG) in infants born to mothers with active infection is also helpful to prevent the transmission.<sup>32,33</sup> An appropriate prophylaxis consists of HBIG and or hepatitis B vaccine at birth.<sup>29,33,34</sup> At birth vaccination with HBIG could reduce the mother-to-child transmission of the infection (overt), though, occult hepatitis B infection could be higher due to the immune pressure of HBIG and suggested administration of antiviral and HBIG during pregnancy to prevent mother-to-child transmission.<sup>35</sup>

The intervention's efficacy is determined by the concentration of the HBV in the mothers' blood. Infected mothers with HBeAg-negative have a near 0% risk of the transmission to their children vaccinated at birth, however, HBeAg-positive mothers have a 20 % risk of the transmission despite the vaccination at birth.<sup>27,32</sup> Treatment of pregnant with antiviral further reduces the risk of transmission to infants from the mothers with a high viral load, though standard guideline on this is awaited.<sup>32</sup>

National Immunization Program (NIP) has provided the vaccine at the 6 weeks of birth with the consideration of the low prevalence of the infection, low rate of facility delivery and cost of the program.<sup>36</sup> The introduction of at birth dose hepatitis B vaccine is still under consideration.<sup>32,37</sup> Furthermore, there is no specific hepatitis B control program in Nepal, though a various activities have been contributing to prevent the infection that include; infection prevention activities through safe motherhood program, harm reduction program through HIV/AIDS control program, infant vaccination program through the NIP, and condom promotion.

Vaccination against hepatitis B has become part of national immunization schedules in 179 countries.<sup>38</sup> WHO has recommended the birth dose vaccination within the 24 hours of birth, the vaccine is under used, reaching 39 % globally in 2015.<sup>27</sup> The prevalence of hepatitis B infection is a global in nature and disproportionately prevalent among the indigenous peoples and WHO considered the indigenous people

as special population for the management of hepatitis B infection that need to be further geared up with an effort.

## CONCLUSIONS

Despite the low prevalence of the infection at the country level, the infection prevalence is disproportionately high among the indigenous people. The global momentum has been initiated for the prevention and control of viral hepatitis infection, a various initiation and policy and program document have been prepared.<sup>2, 3, 27, 32, 37-41</sup> These policies and initiations are supportive to formulate the national and contextual policy and program focusing on equity health care service to combat the infection among the indigenous people.

A national strategy or plan for the prevention, treatment and control of viral hepatitis including hepatitis B infection is required addressing the need of the indigenous populations that include: focused information system and response, intervention with continuum services ensuring outcome and impact, services based on equity, minimizing the risk of financial hardship providing cost effective and efficient services near to their community and context specific response with a innovation that globally accepted and suggested.<sup>40</sup> A triple elimination strategy (HIV, Syphilis and HBV) could be cost effective intervention combating hepatitis B mother-to-child transmission.<sup>42,43</sup> In Nepal, the national HIV Strategy Plan (2016-21) targets to eliminate vertical transmission of HIV and congenital Syphilis for fast-tracking response by 2021, there are possibilities of an integration or coordination between the programs such as National HIV/AIDS and STD control, National Tuberculosis, National Immunization, Safe motherhood and so on.<sup>26,44,45</sup>

To achieve the greatest impact, intervention should be tailored for the indigenous population such as a comprehensive hepatitis B virus immunization program: universal childhood vaccination with birth-dose, catch-up vaccination for children or adolescents where vaccination coverage is low and drop out high, and offering the vaccine to people who are at risk of infection or transmitting the virus.<sup>27,46,47</sup>

This is the high time to start interventions against the disparity issue, as nation has international commitment on SDG to eliminate viral hepatitis; national constitution has firmly stated that every citizen shall have the right to free basic and equity health care services from the State (article-35 and others).<sup>48</sup> Thus, to protect the health right of the indigenous people as per the constitution requires an update in the existing policy and implementing the program and activities that could address the needs of the people.

Finally, hepatitis B prevalence is low at the country level in Nepal but higher among the indigenous people. Given the high prevalence of the infection among the indigenous people; the national policy update along with a comprehensive package is needed to reduce the disparity, prevent the transmission, risk of chronic infection and its sequelae to achieve the national goal and international commitment on the SDG, a 90% reduction in new chronic infections and a 65% reduction in mortality, by 2030, which can benefit the indigenous people, nation and global community.

## Disclosure

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