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Social and behavioral determinants of attitudes towards and practices of hepatitis B vaccine birth dose in Vietnam

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Abstract

Background: Hepatitis B virus (HBV) infection is a significant public health issue in Vietnam. Our goal was to understand the determinants of attitudes towards and practices of hepatitis B vaccine birth dose (HepB-BD) in certain regions of Vietnam.

Method: A rapid qualitative assessment was conducted in three geographically diverse provinces that reported low coverage (<50%) of HepB-BD. Using purposive sampling of participants, 29 focus group discussions and 20 in-depth interviews were held with caregivers (n = 96), healthcare providers (n = 75), and healthcare administrators (n = 16). Summary notes from these were translated, and inductive coding was used to derive themes. The SAGE Vaccine Hesitancy Determinants Matrix was used as a theoretical framework to organize barriers and facilitators associated with the themes into three levels of influence.

Results: At the individual and group level, caregivers who had higher levels of knowledge about HepB-BD sought the vaccine proactively, while others with lower knowledge faced barriers to the vaccine. Some caregivers reported a negative attitude toward health services because of

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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a language barrier or had generalized concerns about HepB-BD due to media reporting of the past adverse events. Distress arising from potential adverse events was equally common among healthcare providers. At the contextual level, the physical environment made it difficult for caregivers to access healthcare facilities and for providers to conduct outreach. Home births posed a challenge for timely administration of HepB-BD, while health facility births facilitated it. Vaccination-specific barriers included misinterpretation of pre-vaccination screening criteria and asking for the consent of caregivers. Inadequate resources for service delivery negatively influenced HepB-BD attitudes and practices.

Conclusion: Given the diversity of barriers associated with attitudes towards and practices of HepB-BD in the three provinces, tailored interventions will be necessary for both demand- and supply-side factors. Rural areas, often with more home births and geographic barriers, may require focused attention.

Keywords

Hepatitis B vaccine; Birth dose; Vietnam; Hesitancy; Demand

1. Background

Hepatitis B virus (HBV) infection, which can cause clinical manifestations such as liver cirrhosis and cancer, is a significant public health issue in Vietnam. In 2016, national HBV infection prevalence was estimated to be 8.2% [1]. In some rural communities, the prevalence has been estimated to be as high as 19% [2]. These estimates are higher than the HBV infection prevalence of 6.2% in the Western Pacific Region [3]. In 2018, Vietnam ranked fourth in the world in age-standardized incidence rate of liver cancer [4].

Hepatitis B vaccine was introduced in 1997 in selected areas of Vietnam and expanded nationwide in 2002 [5]. In 2005, the hepatitis B vaccine birth dose (HepB-BD) was introduced nationally [6]. In 2006, HepB-BD was recommended for administration to newborns within 24 h of birth [5]. Subsequent doses are given as part of a diphtheria-tetanus-pertussis-hepatitis B-*Haemophilus influenzae* type b (pentavalent) vaccine scheduled at ages 2, 3, and 4 months [5]. It is estimated that chronic HBV infection prevalence in Vietnam decreased from 3.6% to 1.6% among children born during 2000–2003 and 2007–2008, respectively [5]. However, to further reduce chronic HBV infection prevalence and its associated morbidity and mortality, HepB-BD coverage needs to be improved because 80–90% of infants infected during the first year of life develop chronic infections [7]. Evidence suggests that infants who receive HepB-BD are 3.5 times less likely to become infected when born to HBV-infected mothers [8,9] but timely HepB-BD coverage, defined as administration of a dose within 24 h of birth, has been low in Vietnam. Nationally, it improved from 68% to 77% during 2016–2017 but remained below the World Health Organization's (WHO) Western Pacific regional goal of 95% HepB-BD coverage [3,6,10].

Previous research indicates that several factors may be associated with the low HepB-BD coverage in Vietnam, including caregivers' limited knowledge about prevention [11], lack of awareness about vaccination among healthcare providers [12], and the scarcity of cold chain vaccine supply [13]. Adverse events following immunization (AEFIs), defined as

unexpected medical occurrences that follow immunization but not necessarily caused by the usage of the vaccine [14], could be another contributing factor. In 2007 and 2013, a series of AEFIs among infants who had received HepB-BD or the pentavalent vaccine was reported by the Vietnamese media [15,16]. Investigations concluded that the AEFIs were caused by human error and revealed no issues with the safety of the vaccines. However, the pentavalent vaccine was temporarily suspended in 2013 [17]. Additionally, following the AEFIs, vaccinators were required to follow a screening list before obtaining a physician's signature to authorize each newborn to receive a HepB-BD.

Limited research has been conducted since the 2007 and 2013 AEFIs to assess determinants of HepB-BD attitudes and practices, including demand- and supply-side factors. Supply-side factors include vaccine and service delivery management, while demand-side factors are associated with the social and behavioral characteristics of the target population [18–20]. To identify and understand determinants of HepB-BD attitudes and practices in Vietnam, a rapid qualitative assessment was carried out in 2017 by the National Expanded Program on Immunization, Hanoi Medical University, WHO, and the U.S. Centers for Disease Control and Prevention (CDC). Specifically, our goal was to understand the attitudes towards and practices of HepB-BD in regards to (1) the influence of supply- and demand-side factors, (2) the impact of the 2007 and 2013 adverse events related to HepB-BD, and (3) potential strategies for addressing any barriers identified.

2. Methods

2.1. Setting

The assessment was conducted in three provinces in Vietnam that reported low coverage of HepB-BD: Son La, Hai Phong, and Gia Lai (Fig. 1). Data from the National Expanded Program on Immunization reported that HepB-BD coverages in 2016 in Son La, Hai Phong, and Gia Lai were 35%, 42.7%, and 46.9%, respectively. Son La, located in the Northern Mountainous region, has a population of 1,099,000. Gia Lai has a population of 1,301,600 and is located in the Central Highlands [21]. There are ethnic minority communities in both Son La and Gia Lai, and some of them live in hard-to-reach mountainous areas. Hai Phong, located in the Red River Delta, is more urban compared to the other two provinces. It is also more populous, with a population of 1,857,800 [21].

2.2. Study population and recruitment

The study population consisted of three groups of participants: caregivers, healthcare providers, and healthcare administrators. Mothers, fathers, and grandparents who had children under five years of age were recruited as caregivers. Some of the caregivers recruited in Son La and Gia Lai belonged to ethnic minority communities, including Giarai and H'mong. Healthcare providers included nurses, physicians, midwives, traditional birth attendants, and other community health workers who were involved in providing vaccination services. Administrators held senior positions in the healthcare system, such as heads of hospital departments and directors of community health centers (CHC). Healthcare providers and administrators were recruited from different levels of the healthcare system, covering province and district-level facilities as well as CHCs located in smaller villages.

Criterion sampling, a purposeful sampling strategy for selecting participants who hold knowledge about the subject of the research [22], was used to recruit eligible study participants. Community-level health workers, who had the most information available about caregivers in their villages, identified the mothers, fathers, and grandparents based on the study criteria. Provincial communi-cable disease control centers' study sites identified healthcare providers and administrators, then recruited them at provincial, district, and community levels to ensure diversification of respondents. Each participant gave verbal informed consent prior to his/her participation, acknowledging a full understanding of the study's purpose, his/her rights to withdraw from the study, and the protection of confidentiality.

2.3. Data collection

We conducted a total of 20 in-depth interviews (IDIs) and 29 focus group discussions (FGDs) with 187 participants: 96 caregivers, 75 healthcare providers, and 16 administrators. IDIs were primarily used with administrators, while most caregivers and providers participated in FGDs. Each FGD consisted of 3 to 9 participants. Separate FGDs were conducted for mothers, fathers, and grandparents. The FGDs with grandparents consisted of both male and female participants. All IDIs and FGDs were administered in person by trained Vietnamese researchers from Hanoi Medical University. Data collection was primarily conducted in Vietnam's national language Kinh, but interpreters were used when speaking to caregivers from ethnic minority communities. Interviews were not audio-recorded due to logistical constraints. However, detailed notes were taken by research assistants during each interview under the supervision of an experienced investigator and project coordinator.

A separate semi-structured interview guide was developed for each of the three participant groups. Six main domains were assessed with caregivers: general use of health services, decision-making process regarding childbirth, experiences of using vaccination services, sources of information and influence regarding immunization, attitude toward HepB-BD, and evaluation of strategies to increase HepB-BD uptake. The interview guides for healthcare providers and administrators assessed similar domains, such as medical services offered, characteristics of the communities served, community members' use of immunization and delivery services, community members' trust in vaccination and health workers, and evaluation of strategies to increase HepB-BD uptake, as well as providers' confidence in vaccines and the nature of inter-actions they had with caregivers while providing HepB-BD. All guides consisted of a series of open-ended questions followed by probes. Data collection took place in December 2017.

2.4. Data analysis

Thematic analysis informed by Grounded Theory was used to generate a coding structure and identify themes [23,24]. Research partners in Vietnam translated all 49 interview summary notes into English. The translated notes were uploaded to qualitative analysis software NVivo 12 [25]. An analyst then read each note and developed memos to record preliminary observations. Based on the memos, a set of inductive codes and a codebook was developed. The codebook went through multiple rounds of revisions and inter-rater

agreement checks among analysts, including the calculation of percentage agreement. Once all notes were coded, the codes that were most relevant to the research questions were selected. The segments of the notes coded with the selected codes were reviewed multiple times and themes were derived.

The SAGE Vaccine Hesitancy Determinants Matrix (VHDM) [26] was used as a framework to organize the themes that emerged from our data. VHDM, a conceptual model for understanding vaccine hesitancy determinants, was chosen because of its widespread international use and comprehensiveness in capturing multiple levels of influence. It arranges determinants into three categories. The first category consists of individual– and group–level factors, which arise from personal perceptions of the vaccine or influences of the interpersonal environment. The second group includes contextual influences that stem from historical, socio-cultural, environmental, or political factors. Lastly, vaccination-specific factors comprise the third group, defined as influences directly related to the vaccine or vaccination process [26]. Every theme was placed in one of the three groups of determinants defined by VHDM. Under each theme, relevant barriers and facilitators that influenced HepB-BD attitudes or practices were specified.

2.5. Ethics

This study was approved by the Ethics Committee of Hanoi Medical University and received a non-research determination from the CDC Human Subjects Office. No compensation was offered to the participants.

3. Results

3.1. Description of the sample

More study participants were enrolled in Gia Lai (42.2%) and Son La (37.4%) compared to Hai Phong (20.3%) (Table 1). The caregiver participants were youngest, followed by healthcare providers, and administrators. The majority of participants were women (60.4%).

3.2. Themes

We identified seven themes describing a demand– or supply– side factor that influenced HepB-BD attitudes and practices. They are arranged into three groups according to VHDM (Table 2). At the individual and group level, each theme is described in relation to a specific group of participants, whereas contextual and vaccination-specific factors involved or influenced multiple stakeholder perspectives. For each theme, differences among provinces or participant subgroups have been noted where applicable.

3.2.1. Individual and group factors

3.2.1.1. Caregivers' knowledge: Caregivers' HepB-BD practices were affected by the varying levels of knowledge they held about HepB-BD and HBV. Key findings were patterned between two groups of caregivers; those who were relatively knowledgeable about HepB-BD and typically sought out the vaccine and others who faced barriers to vaccination due to their lack of information about HepB-BD.

The first group of caregivers was more knowledgeable about the benefits of vaccination; thus, understood the need for HepB-BD vaccination as a preventive measure to protect children's health. Some of these caregivers exhibited knowledge specifically related to HepB-BD, primarily due to their past exposure to the vaccine during a health facility birth. For example, they were aware that the vaccine was supposed to be administered within 24 h of birth. Healthcare providers mentioned that such knowledgeable caregivers sometimes voluntarily requested that their children receive the vaccine. These caregivers displaying higher levels of knowledge were found among mothers, fathers, and grandparents.

The second group, though smaller in number, consisted of caregivers whose awareness about HBV and HepB-BD was low. Of this group, those with the lowest levels of knowledge stated that they had not heard of hepatitis B. Some others in this group may have heard of the disease, but their understanding of the associated health risks was limited. Likewise, these caregivers did not know the benefits of HepB-BD or when it should be administered. The caregivers in this group were mostly fathers and grandparents, with the exception of a group of mothers from Son La whose children were all delivered at home.

3.2.1.2. Caregivers' attitudes: Another factor that influenced caregivers' behavior was differing attitudes towards health services, including immunization. Most caregivers' attitudes could be characterized as positive, and they were willing to receive medical services to protect their children's health. Many caregivers stated that they used monthly childhood immunization services for diseases such as measles and diphtheria. Their acceptance of immunization services stemmed from high levels of trust they had in state-run health services, especially large district– or province–level facilities. Many of them also expressed appreciation for health workers' expertise and felt confident about the medical advice they received.

Other caregivers displayed a negative attitude toward the healthcare system, including generalized concerns about HepB-BD. Driven by the widely reported news of the past AEFIs, they believed that low-quality or counterfeit vaccines could lead to fatal incidents for their own children. However, it should be noted that this concern was only reported by some caregivers; others explained that they had become less concerned because they did not personally witness any AEFIs since those media reports first emerged. Communication from providers highlighting the benefits and safety of HepB-BD also seemed to play a role in changing the minds of caregivers who were initially worried about AEFIs. Members of ethnic minority communities were hesitant to use health services because they were often unable to communicate in the same language as the providers; they felt they could be embar-rassed in front of providers. The language barrier was more pro-nounced in Gia Lai and Son La.

3.2.1.3. Healthcare providers' attitudes: HepB-BD practices were not only influenced by caregivers' attitudes, but also by healthcare providers' attitudes toward the vaccine. Many providers expressed that they were anxious about causing AEFIs. Although they reiterated that it was normal for health workers to be worried about AEFIs when administering vaccines to children in general, their concern about HepB-BD was particularly evident. A factor that exacerbated healthcare providers' concerns were the media reports of previous

AEFIs related to HepB-BD. According to comments shared by both healthcare providers and administrators, they became worried about being held legally accountable for AEFIs after seeing the news stories of medical professionals who were accused of malpractice and eventually arrested. Even if there were no legal consequences, some providers said that they were apprehensive about being blamed by parents. Another cause for concern, especially relevant to providers working in smaller healthcare facilities, was the lack of medical equipment and knowledge needed to adequately respond to AEFIs. For example, it was mentioned that tools for treating post-vaccination anaphylaxis were unavailable.

Together, these factors amplified providers' concern about HepB-BD, in turn affecting their approach to providing the vaccine. Although providers' passive attitudes did not always cause them to modify their clinical behavior, it was suggested in the interviews that a few of them were so concerned that they were reluctant to inform caregivers about the HepB-BD vaccination for their newborns.

3.2.2. Contextual factors

3.2.2.1. Physical environment: The physical environment was repeatedly mentioned by participants as a determinant of HepB-BD attitudes and practices. The topographic characteristics of the provinces not only created barriers for caregivers trying to access immunization but also prevented health workers from providing vaccination services sometimes.

Fragile road conditions and long distances to healthcare facilities made it challenging for caregivers to access services for childbirth and immunization. Some caregivers reported that they were located more than 10 km away from healthcare facilities—an inconvenient distance to travel given their limited means of available transportation. Caregivers living in remote communities had limited access to province– and district–level healthcare facilities, which usually offered high-quality services. The fragile road conditions also made long-distance travel difficult on rainy days. Consequently, it was not always feasible for these caregivers to travel to hospitals to give birth or to have their child vaccinated with HepB-BD on time. These environmental conditions also hindered healthcare providers' outreach efforts. Educational outreach targeting caregivers in remote communities was already a challenging task because they tended to be away from home due to their agrarian lifestyle, but the physical barriers further increased the difficulty of effectively reaching them. Additionally, the lack of cold boxes to preserve vaccine quality while traveling to multiple remote communities posed a logistical complexity for the healthcare providers conducting mobile vaccination services.

Participants from Hai Phong, the more urban province, rarely mentioned barriers related to the physical environment unlike participants from Gia Lai and Son La. Based on comments provided by healthcare providers and administrators, those living in remote locations tended to be ethnic minority populations such as the H'mong, suggesting that they may be disproportionately affected by environmental barriers.

3.2.2.2. Place of childbirth: Caregivers' preferences about where to give birth influenced HepB-BD attitudes and practices. Institutional delivery, a practice that was more commonly

reported by participants from Hai Phong, appeared to facilitate vaccination. Conversely, babies delivered at home were less likely to receive HepB-BD, as demonstrated by participant responses from Gia Lai and Son La.

Childbirths taking place in the larger province– and district– level healthcare facilities promoted the uptake of HepB-BD because physicians could vaccinate newborns during postpartum monitoring. Caregivers, mostly from Hai Phong, did not have to have high levels of awareness or intention to get the vaccine if they were giving birth in these larger facilities, as providers were able to recommend the vaccine in person. Therefore, timely administration of HepB-BD was usually achieved in this setting if there were no other barriers at the point of service.

For caregivers in Gia Lai and Son La, home birth was often a more feasible method of delivery that required less money and time than giving birth in a healthcare facility. After giving birth at home, typically with the assistance of traditional birth attendants, timely administration of HepB-BD was often logistically difficult. Furthermore, home birth was considered an important tradition among ethnic minority populations and created an emotional barrier to institutional birth. Some caregivers were inclined to wait until monthly vaccination services offered at local health centers instead of traveling to hospitals situated far from their homes, especially if they were unaware that HepB-BD should be given within 24 h of birth. Some of the caregivers opting for home birth did not receive perinatal consultation from healthcare providers, including education about HepB-BD.

3.2.3. Vaccination-specific factors

3.2.3.1. Vaccine administration procedures: Certain procedural steps were carried out by healthcare providers as precautionary measures when administering HepB-BD, but they sometimes presented barriers to HepB-BD attitudes and practices in at least two different ways. First, a few administrators in Gia Lai and Son La stated that vaccinators in their facilities avoided administering HepB-BD even if the neonate did not have any contraindication to vaccination. It is possible that some neo-nates who would have otherwise been vaccinated did not receive HepB-BD because of unclear screening guidelines or healthcare providers' incorrect interpretation of the eligibility requirements. Second, asking for informed consent prior to vaccination discour-aged caregivers from accepting the vaccine. Caregivers used words such as "unsafe" and "afraid" to express how they felt when healthcare providers requested them to sign this "commitment of responsibility" document. Caregivers from Hai Phong frequently indicated that they had to sign the form, while almost no one in the other two provinces discussed needing to sign it.

3.2.3.2. Resources for vaccine delivery: The availability of resources for service delivery determined healthcare providers' ability to provide vaccination, and this, in turn, affected HepB-BD practices. Smaller healthcare facilities, including CHCs, tended to lack a steady supply of hepatitis B vaccines because they did not have cold chain storage capabilities. Additionally, power infrastructures were usually not fully developed in Gia Lai and Son La, posing another challenge to vaccine cold chain maintenance. This made timely

administration of HepB-BD diffi-cult because healthcare providers usually had to go to larger healthcare facilities and collect vaccines whenever there was a delivery.

Inadequate human resources became a barrier to service delivery as well. Providers who did not receive training on HepB-BD felt that they were not equipped with the skills needed to confidently manage the vaccine and possible reactions to it. Lack of training was a factor even for physicians working at larger hospitals because those who were not specialized in obstetrics and gynecology sometimes failed to recommend HepB-BD when they were on duty to oversee childbirth. Only a few healthcare providers stated that they had received training focusing on HepB-BD. Lastly, staff shortage was another human resource issue, particularly in Son La. In CHCs where a limited number of health workers performed a high volume of tasks, activities related to immunization such as appropriate vaccine storage practices were not always prioritized.

3.2.4. Strategies to improve uptake of HepB-BD—In addition to the determinants of HepB-BD attitudes and practices, we explored participants' perspectives on how to improve these. Their suggestions, which mostly corresponded to the identified barriers, were categorized into two themes: communication about hepatitis B vaccine and service delivery.

3.2.4.1. Communication about the hepatitis B vaccine: Many caregivers and healthcare providers believed that communicating the benefits and safety of HepB-BD to the general public was critical. Participants reported that education about HepB-BD should target a wide range of audiences, including fathers and grandmothers who could play an important role in the decision-making process regarding childhood immunization. Engaging community stakeholders other than healthcare providers was also proposed by participants as a potentially effective communication strategy. For example, instead of relying solely on providers to communicate to caregivers, respected figures in the community such as leaders of unions or religious organizations can disseminate information about HepB-BD. Lastly, to optimize the reach of communication, participants recommended utilizing multiple channels, ranging from in-person education during ante-natal check-ups to community announcements via loudspeakers. To effectively reach ethnic minority communities, participants pointed out that communication materials should be in their language.

3.2.4.2. Service delivery: Healthcare providers and administrators reiterated that improvements were required to facilitate the provision of services related to HepB-BD. Particularly in CHCs, better vaccine storage capabilities were necessary to enable timely HepB-BD administration. Providers and administrators also noted that a system for monitoring households expecting childbirth could be helpful for the timely provision of HepB-BD. Moreover, issues related to human resources needed to be addressed in order to improve service delivery. For example, participants pointed out that smaller facilities experiencing staff shortages could benefit from additional workers so more resources can be directed to the management and promotion of immunization services. It was suggested that training sessions be implemented to reduce the number of health workers feeling hesitant about HepB-BD; training content could cover post-vaccination monitoring, appropriate interaction with caregivers about AEFI, and dialect lessons for communicating with ethnic minority populations.

4. Discussion

In this assessment looking at demand– and supply–side factors influencing HepB-BD attitudes and practices, we found more barriers than facilitators, reflecting the suboptimal uptake of HepB-BD in certain regions of Vietnam. Interventions are needed at all three levels of the VHDM framework (i.e. individual and group, contextual, and vaccination-specific) and will require a diverse menu of tailored interventions to achieve the national and Western Pacific regional goal of hepatitis B control, defined as achieving a prevalence of chronic HBV infection of less than 1% among children aged 5 years by 2017 [6].

At the individual and group levels, caregivers' low levels of knowledge about HepB-BD and HBV were identified as a barrier. Similar findings have been reported in China, Malaysia, and Canada [27–29]. In Vietnam, a cross-sectional study found that only 10.8% of the 380 women surveyed correctly answered all questions about HBV and preventive measures [11], reinforcing the results of our assessment. In addition to knowledge, another barrier at the individual and group level was caregivers' attitudes toward immunization. Specifically, media reports of past AEFIs generated concerns among some caregivers. A study conducted in an urban clinic in Vietnam's capital Hanoi showed that caregivers' willingness to vaccinate their children was negatively affected after having heard about AEFIs in the media [15]. Our assessment suggested that media coverage of AEFIs negatively influenced caregivers' attitudes in rural parts of the country as well. We also found that healthcare providers' confidence to vaccinate was reduced by AEFIs previously reported in the media. This finding is in line with previously reported data from Canada and France, which revealed that healthcare providers' willingness to recommend a vaccine was associated with its perceived safety [30,31]. Our assessment adds to the literature by showing that the legal ramifications of AEFIs reported in the media can lower healthcare providers' confidence by instilling the fear of punishment. As suggested by these findings, interventions should target both supply– and demand–sides to address determinants at the individual and group levels. For example, programs should consider education to improve caregivers' knowledge about HepB-BD and training for healthcare providers on handling AEFIs in order to build their confidence.

At the socio-contextual level, we found that caregivers living in remote communities had difficulty accessing healthcare facilities due to fragile road conditions and long distances. This finding aligns with research from Indonesia and Colombia that reported geographic barriers to hepatitis B vaccination [32,33]. However, assessments performed in other regions of Vietnam showed that HepB-BD uptake was higher in rural areas than those in urban areas [34,35]. It is possible that the types of geographic barriers identified in our study were not present in the rural regions exam-ined in those assessments. This discrepancy can also be explained by differences in health care delivery systems because programs such as outreach clinics can possibly help achieve high coverage of HepB-BD even in some remote locations [36]. Another determinant at the contextual level was the place of childbirth. We found that health facility births usually facilitated HepB-BD vaccination as documented by a number of studies conducted in different countries [37–39]. By contrast, home births posed a significant challenge for the timely administration of HepB-BD, a finding consistent with research from Cambodia and Indonesia [33,40]. Our study provides additional insight into

the diversity of factors involved in some caregivers' preference for home birth, including cultural values unique to ethnic minority populations in Vietnam. Vaccine delivery services such as mobile vaccination teams or outreach clinics should be considered to address the geographical barriers. As suggested by the participants, programs can also collaborate with community gatekeepers to disseminate messages about the benefits of health facility birth. More research is needed to understand how geographic barriers may influence HepB-BD attitudes and practices differently across rural regions in Vietnam.

Several vaccination-specific factors were also reported. We found that unclear screening guidelines and misinterpretation of eligibility requirements for HepB-BD administration led to perceived contraindications. A study published in 2008 reported a similar barrier among healthcare providers in Ho Chi Minh City and three other provinces in Vietnam [41]. Although WHO's guideline states that HepB-BD can be safely administered to low birth weight infants [9], newborns weighing less than 2,500 g were sometimes excluded from receiving the vaccine [41]. Our assessment illustrates that such confusion and misinterpretation regarding eligibility requirements continued to exist over the past decade. Although it has been reported previously that consent procedure resulted in rumors about human papillomavirus vaccine safety [42], to our knowledge, our assessment is the first to show informed consent procedures for HepB-BD can also have a negative impact on caregiver attitudes, including increased concern about the vaccine. Deficient vaccine storage capability was another barrier at the vaccination-specific level. Cold chain constraints are a common challenge to HepB-BD provision, not only in Vietnam [13,43] but also in other countries in the Western Pacific Region [44]. In addition to the scarcity of refrigeration equipment, our data revealed that cold chain maintenance was further hindered by the lack of reliable power infrastructures in rural regions. Prior research corroborates the importance of adequate human resources for delivering vaccination-related services [45]. For example, a group of midwives in England was reluctant to provide influenza vaccines to pregnant women due to increased workload and inadequate training [46]. Financial and human resource support for the supply side will be needed to address these barriers at the vaccination-specific level. As suggested by the participants, CHCs in remote locations would benefit from funding for vaccine storage equipment. In healthcare facilities where misinterpretation of HepB-BD eligibility requirements can be common, administrators should review pre-vaccination guidelines (which were recently updated) and communicate with vaccinators to avoid perceived contraindications.

In addition to addressing barriers at all three levels of influence, strategies for improving HepB-BD attitudes and practices should be tailored to different regional and cultural needs. Some barriers were widely reported regardless of region, but other barriers such as geographic inconvenience were specific to Gia Lai and Son La. Considering the recent study findings that reported a lower prevalence of timely HepB-BD administration among Vietnamese children residing in rural areas [47], it is understandable that we identified more barriers in the two rural provinces. Cultural implications of some determinants should also be considered. For example, as mentioned in our assessment and more extensively discussed in previous research [48], it is common for the H'mong to ascribe cultural importance to home birth. Targeted interventions that accommodate such regional and cultural variations

are needed not only to promote positive vaccination attitudes and practices but also for maternal and child health in general.

This study had certain limitations. We were unable to record verbatim transcripts due to logistical constraints; therefore, nuances in participant responses may not have been fully captured, research assistants may have only recorded data that they perceived to be relevant, and verbatim quotations could not be utilized. To minimize potential bias introduced by note-taking, project coordinators regularly held debriefing sessions with facilitators and note-takers to identify information gaps for follow-up. For Hai Phong, data saturation may not have been reached because only 38 individuals from the province participated, while a total of 70 and 79 participants were interviewed in Son La and Gia Lai, respectively. Despite the limitations, the strength of this assessment was that triangulation was achieved by using different interview methods and collecting data from various types of audiences [49]. This led to a more comprehensive understanding of the research topic and enabled us to highlight determinants at multiple levels.

5. Conclusion

This qualitative rapid assessment identified determinants of HepB-BD attitudes and practices in three different geographical areas of Vietnam. While some of the determinants helped to promote positive HepB-BD attitudes and practices, there were multiple barriers at each level of VHDM—individual, contextual, and vaccination-specific levels—that negatively affected caregivers, healthcare providers, service delivery, and vaccination resources. The 2007 and 2013 AEFIs were only one of many factors that undermined HepB-BD attitudes and practices. Given the diversity of barriers, interventions that adopt a holistic approach will be necessary. Specifically, interventions should target barriers at all levels of influence, operating on both demand and supply sides, while also considering regional and cultural variations.

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References

[1]. Razavi-Shearer D, Gamkrelidze I, Nguyen MH, Chen D-S, Van Damme P, Abbas Z, et al. Global prevalence, treatment, and prevention of hepatitis B virus infection in 2016: a modelling study. Lancet Gastroenterol Hepatol 2018;3:383–403. 10.1016/S2468-1253(18)30056-6. [PubMed: 29599078]

[2]. Nguyen VT-T, McLaws M-L, Dore GJ. Highly endemic hepatitis B infection in rural Vietnam. J Gastroenterol Hepatol 2007;22:2093–100. 10.1111/j.1440-1746.2007.05010.x. [PubMed: 17645465]

[3]. World Health Organization. Global hepatitis report 2017. World Health Organization; 2017.

[4]. World Health Organization. Hepatitis data and statistics in the Western Pacific; 2020.

[5]. Nguyen TH, Vu MH, Nguyen VC, Nguyen LH, Toda K, Nguyen TN, et al. A reduction in chronic hepatitis b virus infection prevalence among children in vietnam demonstrates the importance of vaccination; 2014;32(2):217–22. 10.1016/j.vaccine.2013.11.004.

[6]. Woodring J, Pastore R, Brink A, Ishikawa N, Takashima Y, Tohme R. Progress Toward Hepatitis B Control and Elimination of Mother-to-Child Transmission of Hepatitis B Virus — Western Pacific Region, 2005–2017. MMWR Morb Mortal Wkly Rep 2019;68:195–200. , 10.15585/mmwr.mm6808a2. [PubMed: 30817746]

[7]. World Health Organization. Hepatitis B; 2020. https://www.who.int/news-room/fact-sheets/detail/hepatitis-b (accessed September 8, 2020).

[8]. Lee C, Gong Y, Brok J, Boxall EH, Gluud C. Hepatitis B immunisation for newborn infants of hepatitis B surface antigen-positive mothers. Cochrane Database Syst Rev 2006. 10.1002/14651858.CD004790.pub2.

[9]. World Health Organization. Hepatitis B vaccines: WHO position paper - July 2017. Wkly Epidemiol Rec 2017;92.

[10]. World Health Organization. Coverage time series for Viet Nam (VNM); 2019.

[11]. Hang Pham TT, Le TX, Nguyen DT, Luu CM, Truong BD, Tran PD, et al. Knowledge, attitudes and practices of hepatitis B prevention and immunization of pregnant women and mothers in northern Vietnam. PLoS ONE 2019;14. e0208154–. [PubMed: 30969972]

[12]. Gish RG, Bui TD, Nguyen CTK, Nguyen DT, Tran HV, Tran DMT, et al. Liver disease in Viet Nam: Screening, surveillance, management and education: A 5-year plan and call to action. J Gastroenterol Hepatol 2012;27:238–47. 10.1111/j.1440-1746.2011.06974.x. [PubMed: 22098550]

[13]. Hipgrave DB, Nam Tran T, Minh Huong V, Tuan Dat D, Tuyet Nga N, Thuy Long H, et al. Immunogenicity of a locally produced hepatitis B vaccine with the birth dose stored outside the cold chain in rural Vietnam. Am J Trop Med Hyg 2006;74:255–60. [PubMed: 16474080]

[14]. World Health Organization. Adverse event following immunization (AEFI); 2019.

[15]. Tran BX, Boggiano VL, Nguyen LH, Latkin CA, Nguyen HLT, Tran TT, et al. Media representation of vaccine side effects and its impact on utilization of vaccination services in Vietnam. Patient Prefer Adherence 2018;12:1717–28. 10.2147/PPA.S171362. [PubMed: 30233151]

[16]. Li X, Wiesen E, Diorditsa S, Toda K, Duong TH, Nguyen LH, et al. Impact of Adverse Events Following Immunization in Viet Nam in 2013 on chronic hepatitis B infection. Vaccine 2016;34(6):869–73. 10.1016/j.vaccine.2015.05.067. [PubMed: 26055296]

[17]. World Health Organization. Meeting Report: The Third Hepatitis B Expert Resource Panel Consultation; 2015.

[18]. Warigon C, Mkanda P, Muhammed A, Etsano A, Korir C, Bawa S, et al. Demand Creation for Polio Vaccine in Persistently Poor-Performing Communities of Northern Nigeria: 2013–2014. J Infect Dis 2016;213:S79–85. 10.1093/infdis/jiv511. [PubMed: 26908717]

[19]. Johri M, Pérez MC, Arsenault C, Sharma JK, Pai NP, Pahwa S, et al. Strategies to increase the demand for childhood vaccination in low- and middle-income countries: a systematic review and meta-analysis. Bull World Health Organ 2015;93:339–346C. 10.2471/BLT.14.146951. [PubMed: 26229205]

[20]. Ghosh A, Laxminarayan R. Demand- and supply-side determinants of diphtheria-pertussis-tetanus nonvaccination and dropout in rural India. Vaccine 2017;35:1087–93. 10.1016/j.vaccine.2016.12.024. [PubMed: 28081971]

[21]. General Statistics Office of Viet Nam. Average population by province; 2010.

[22]. Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. Adm Policy Ment Health 2015;42:533–44. 10.1007/s10488-013-0528-y. [PubMed: 24193818]

[23]. Chapman A, Hadfield M, Chapman C. Qualitative research in healthcare: an introduction to grounded theory using thematic analysis. J R Coll Physicians Edinb 2015;45:201–5. 10.4997/JRCPE.2015.305. [PubMed: 26517098]

[24]. Corbin J, Strauss A. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. SAGE Publications 2014.

[25]. QSR International Pty Ltd. NVivo; 2018.

[26]. MacDonald NE. Vaccine hesitancy: Definition, scope and determinants. Vaccine 2015;33:4161–4. 10.1016/j.vaccine.2015.04.036. [PubMed: 25896383]

[27]. Rajamoorthy Y, Taib NM, Munusamy S, Anwar S, Wagner AL, Mudatsir M, et al. Knowledge and awareness of hepatitis B among households in Malaysia: a community-based cross-sectional survey. BMC Public Health 2019;19:47. 10.1186/s12889-018-6375-8. [PubMed: 30630464]

[28]. Yau AHL, Ford JA, Kwan PWC, Chan J, Choo Q, Lee TK, et al. Hepatitis B Awareness and Knowledge in Asian Communities in British Columbia. Can. J Gastroenterol Hepatol 2016. 10.1155/2016/4278724.

[29]. Han Z, Yin Y, Zhang Y, Ehrhardt S, Thio CL, Nelson KE, et al. Knowledge of and attitudes towards hepatitis B and its transmission from mother to child among pregnant women in Guangdong Province, China. PLOS ONE 2017;12: e0178671. [PubMed: 28575040]

[30]. Verger P, Fressard L, Collange F, Gautier A, Jestin C, Launay O, et al. Vaccine Hesitancy Among General Practitioners and Its Determinants During Controversies: A National Cross-sectional Survey in France. EBioMedicine 2015;2:891–7. 10.1016/j.ebiom.2015.06.018. [PubMed: 26425696]

[31]. Gilca V, Boulianne N, Dubé E, Sauvageau C, Ouakki M. Attitudes of nurses toward current and proposed vaccines for public programs: A questionnaire survey. Int J Nurs Stud 2009;46:1219–35. 10.1016/j.ijnurstu.2009.02.013. [PubMed: 19349047]

[32]. Choconta-Piraquive LA, De La Hoz-Restrepo F, Sarmiento-Limas CA. Compliance with birth dose of Hepatitis B vaccine in high endemic and hard to reach areas in the Colombian amazon: Results from a vaccination survey. BioMed Central Ltd. 2016;16. 10.1186/s12913-016-1542-z.

[33]. Creati M, Saleh A, Ruff TA, Stewart T, Otto B, Sutanto A, et al. Implementing the birth dose of hepatitis B vaccine in rural Indonesia. Vaccine 2007;25:5985–93. 10.1016/j.vaccine.2007.05.055. [PubMed: 17604881]

[34]. Pham TT, Le HM, Nguyen DT, Maertens K, Leuridan E, Theeten H, et al. Assessment of the timely administration of the hepatitis B and BCG birth dose and the primary infant vaccination schedule in 2015–2016 in the Mekong Delta, Viet Nam. Vaccine 2018;36:5760–5. 10.1016/J.VACCINE.2018.08.002. [PubMed: 30121141]

[35]. Giao H, Quang Vinh B, Huynh Tam Lang N, Le An P. Parents' Attitude about Hepatitis B Disease and Practice of Hepatitis B Vaccination among Children in Ho Chi Minh City, Vietnam. BioMed Res Int 2019;2019:1–7. 10.1155/2019/9323814

[36]. Miyahara R, Jasseh M, Gomez P, Shimakawa Y, Greenwood B, Keita K, et al. Barriers to timely administration of birth dose vaccines in The Gambia, West Africa. Vaccine 2016;34:3335–41. 10.1016/j.vaccine.2016.05.017. [PubMed: 27195759]

[37]. Allison RD, Patel MK, Tohme RA. Hepatitis B vaccine birth dose coverage correlates worldwide with rates of institutional deliveries and skilled attendance at birth. Vaccine 2017;35:4094–8. 10.1016/J.VACCINE.2017.06.051. [PubMed: 28668571]

[38]. Dionne-Odom J, Westfall AO, Nzuobontane D, Vinikoor MJ, Halle-Ekane G, Welty T, et al. Predictors of Infant Hepatitis B Immunization in Cameroon: Data to Inform Implementation of a Hepatitis B Brith Dose. Pediatr Infect Dis J 2018;37:103–7. 10.1097/inf.0000000000001728. [PubMed: 28787383]

[39]. Wiesen E, Lagani W, Sui G, Arava J, Reza S, Diorditsa S, et al. Assessment of the hepatitis B birth dose vaccination program, Papua New Guinea, 2014. Vaccine 2016;34:367–72. 10.1016/j.vaccine.2015.11.044. [PubMed: 26620839]

[40]. Mao B, Patel MK, Hennessey K, Duncan RJW, Wannemuehler K, Soeung SC. Prevalence of chronic hepatitis B virus infection after implementation of a hepatitis B vaccination program among children in three provinces in Cambodia. Vaccine 2013;31:4459–64. 10.1016/j.vaccine.2013.05.009. [PubMed: 23684825]

[41]. Murakami H, Van Cuong N, Huynh L, Hipgrave DB. Implementation of and costs associated with providing a birth-dose of hepatitis B vaccine in Viet Nam. Vaccine 2008;26:1411–9. 10.1016/J.VACCINE.2008.01.002. [PubMed: 18262312]

[42]. Kabakama S, Gallagher KE, Howard N, Mounier-Jack S, Burchett HED, Griffiths UK, et al. Social mobilisation, consent and acceptability: a review of human papillomavirus vaccination procedures in low and middle-income countries. BMC Public Health 2016;16:834. 10.1186/s12889-016-3517-8. [PubMed: 27543037]

[43]. PATH. Protecting newborns from hepatitis B in Vietnam: Expanding coverage of the hepatitis B vaccine birth dose; 2014.

[44]. Petit D, Tevi-Benissan C, Woodring J, Hennessey K, Kahn A-L. Countries' interest in a hepatitis B vaccine licensed for the controlled temperature chain; survey results from African and Western Pacific regions. Vaccine 2017;35:6866–71. 10.1016/j.vaccine.2017.10.025. [PubMed: 29132994]

[45]. Paterson P, Meurice F, Stanberry LR, Glismann S, Rosenthal SL, Larson HJ. Vaccine hesitancy and healthcare providers. Vaccine 2016;34:6700–6. 10.1016/j.vaccine.2016.10.042. [PubMed: 27810314]

[46]. Ishola DA, Permalloo N, Cordery RJ, Anderson SR. Midwives' influenza vaccine uptake and their views on vaccination of pregnant women. J Public Health Oxf Engl 2013;35:570–7. 10.1093/pubmed/fds109.

[47]. Nguyen Si Anh H, Vo H-L, Hoang Bao L, Tran Minh H, Tran Thi Thu H, Kien VD. Hepatitis B Birth Dose Vaccination among Vietnamese Children: Implications for the Expanded Program on Immunization. BioMed Res Int 2019;2019:3453105. 10.1155/2019/3453105. [PubMed: 31317025]

[48]. Corbett CA, Callister LC, Gettys JP, Hickman JR. The Meaning of Giving Birth: Voices of Hmong Women Living in Vietnam. J Perinat Neonatal Nurs 2017;31:207–15. 10.1097/JPN.0000000000000242. [PubMed: 28244883]

[49]. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ. The Use of Triangulation in Qualitative Research. Oncol Nurs Forum 2014;41:545–7. 10.1188/14.onf.545-547. [PubMed: 25158659]

Fig. 1.

Locations of the Study Sites (Son La, Hai Phong, Gia Lai), Rapid Qualitative Assessment, Vietnam, December 2017*. * "Vietnam location map" by Uwe Dedering is licensed under CC BY-SA 3.0. https://commons.wikimedia.org/wiki/File:Vietnam_location_map.svg#filelinks.

Table 1

Descriptive Statistics of the Study Population by Participant Type, Rapid Qualitative Assessment, Vietnam*, December 2017.

Characteristics	Caregiver (n = 96)	Healthcare Provider (n = 75)	Administrator (n = 16)	Overall (n = 187)
Type of Interview				
In-depth interviews (20)	1 (1%)	3 (4%)	16 (100%)	20 (10.7%)
Focus group discussions (29)	95 (99%)	72 (96%)	0	167 (89.3%)
Province				
Son La	30 (31.3%)	33 (44%)	7 (43.8%)	70 (37.4%)
Gia Lai	35 (36.5%)	36 (48%)	8 (50%)	79 (42.2%)
Hai Phong	31 (32.3%)	6 (8%)	1 (6.3%)	38 (20.3%)
Age (years)				
Mean (SD)	32.5 (9.4)	35 (6.5)	41 (4.6)	36.1 (7.2)
Gender				
Male	46 (47.9%)	25 (33.3%)	3 (18.8%)	74 (39.6%)
Female	50 (52.1%)	50 (66.7%)	13 (81.3%)	113 (60.4%)

SD = standard deviation.

*Assessment was conducted in three provinces: Son La, Hai Phong, Gia Lai.

Table 2

Determinants of Hepatitis B Vaccine Birth Dose Attitudes and Practices, Rapid Qualitative Assessment, Vietnam*, December 2017.

Determinant	Theme	Facilitators	Barriers
Individual and Group Factors	Caregivers' Knowledge	Many caregivers had heard of hepatitis B Many caregivers understood the basic benefits of immunization in general	Some caregivers had lower awareness of immunization including HepB-BD, such as lack of knowledge regarding its benefits or when it should be given
	Caregivers' Attitude	Most caregivers had a positive attitude toward healthcare providers and state-run health services	Some caregivers had generalized concerns about HepB-BD after seeing media reports of AEFI Members of ethnic minority communities were sometimes hesitant to use health services because of the language barrier
	Healthcare Pro-viders' Attitude		Concern caused by media reports of AEFI was common among providers, including fear of jeopardizing their careers
Contextual Factors	Physical Environment		Caregivers living in remote places lacked access to health services due to long distances and fragile road conditions Providers had difficulty conducting outreach and mobile vaccination in remote regions
	Place of Childbirth	Caregivers who gave birth in large hospitals were more likely to receive HepB-BD	Home birth made HepB-BD administration within 24 h of birth difficult, mostly among ethnic minority communities
Vaccination-Specific Factors	Vaccine Admin-istration Procedures		Unclear screening guidelines and misinterpretation of eligibility requirements for HepB-BD administration resulted in perceived contraindications Signing pre-vaccination consent forms increased caregivers' concern
	Resources for Vaccine Delivery		Lack of reliable HepB-BD supply and cold chain led to logistical inconvenience Inadequate human resources led to non-vaccination or poor management of vaccines

*Assessment was conducted in three provinces: Son La, Hai Phong, Gia Lai.