Understanding Newborn Hepatitis B Immunization Refusal: One Size Does Not Fit All

Liat Ashkenazi-Hoffnung[1,3] and Ilan Youngster[2,3]

[1]Department of Pediatrics, Schneider Children's Medical Center of Israel, Petah Tikva, Israel
[2]Pediatric Infectious Diseases Unit and the Center for Microbiome Research, Shamir Medical Center (Assaf Harofeh), Zerifin, Israel
[3]Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

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Hepatitis B virus (HBV) infection remains an important global health problem despite an available vaccine, with over 250 million chronically infected people [1]. In adults, infection with HBV leads to chronic hepatitis in 5–10% of the cases. However, children who are infected during the perinatal period mostly fail to clear the virus, resulting in 90% chronic infection. Chronically infected children are at risk of developing liver cirrhosis and hepatocellular carcinoma [2,3]. The main route of HBV transmission in countries with a low level of HBV endemicity is parenteral; however, where HBV is moderately endemic, horizontal transmission is significant as well [4-6].

Since 1992, the World Health Organization (WHO) has been recommending global vaccination against HBV, and by the end of 2018, 189 countries, including Israel, implemented a universal HBV immunization program. With increasing hepatitis B vaccination coverage, including immunization at birth, the proportion of children under 5 years of age who are chronically infected has decreased more than threefold [1]. HBV infection is a vaccine-preventable disease, but although universal control is achievable, it has not yet been attained and close to 40 years after the availability of HBV vaccine, the disease is far from being eradicated. A worldwide policy of universal HBV vaccination is the only way to eliminate HBV transmission and prevent HBV-related liver disease.

Continual parental acceptance of childhood vaccination, including the birth dose of HBV vaccine, is critical for the success of governmental policies for disease prevention; and parental refusal of vaccines is a growing concern worldwide [7]. Thus, understanding the parental decision-making process in relation to childhood vaccination programs is vital to developing effective interventions.

Fridman and colleagues [8], in the current issue of the *Israel Medical Association Journal* (*IMAJ*), used a prospective pair-matched trial to examine maternal perceptions and analyze the reasons that mothers delay or refuse to vaccinate their children with the birth dose of HBV vaccine. They add to a number of studies examining parental perceptions of barriers to childhood immunization [9-17]. During the study period, October 2014 to October 2016, 0.9% of mothers declined the birth dose of HBV vaccine, and 62% of those were included in the study group. Similar to previous studies, the most common reasons found for refusal of vaccination were newborn pain and vaccine unnecessity. Over 80% of the study group failed to understand the necessity of a birth dose of HBV vaccination for prevention of vertical transmission of HBV and stated that the early vaccination schedule was based on the Ministry of Health's convenience. Mothers in the study group were not aware of the possibility of horizontal transmission during the first year of life, despite feeling knowledgeable about the subject. These data show knowledge gaps that need to be addressed.

The opposing mothers were middle-class and educated who, despite trusting in the government and healthcare policies, independently searched for data on vaccination across multiple sources. This study population from the Petah Tikva district of Israel obviously differs from other populations described in previous studies, such as low socioeconomic, under-educated, young mothers belonging to ethnic minorities. If so, what is the correct approach to improve vaccination rates among these parents? What would be the most effective intervention in this population?

In a qualitative study, Brunson [18] sought to develop an understanding of parental decisions about their child's vaccinations. They recommended a personalized tailored approach to parental vaccine refusal. The study suggests that three general assessment groups of parents exist:

- Acceptors: rely primarily on general social norms to make their vaccination decisions
- Reliers: rely primarily on other people and social norms for information and advice
- Searchers: search for information on their own, primarily from published sources

Their results imply that one-size-fits-all approaches to vaccination interventions are inappropriate. Instead, interventions must be targeted to parents based on how they assess vaccinations.

To improve rates of vaccination among acceptors and reliers, in whom social norms play a key role in decision-making,

it is important that interventions are targeted broadly so that they maintain a general pro-vaccination social norm and address people who the parents are likely to include in their social networks, such as family and friends. However, vaccine decisions in the searching group are not based on social norms, but primarily on critical evaluation of published sources. Therefore, interventions to improve vaccination rates in this population should include publication of reliable information. Moreover, because searchers are likely to be critical of the information they obtain, intervention materials should provide scientific evidence for the conclusions reached, should not include opinions or scare tactics, and should offer a balanced perspective that realistically considers the multiple types of risks involved.

Based on the maternal characteristics in the current article by Fridman et al. [8] we suggest that the population opposing HBV vaccination represented mainly belongs to the searchers group. Hence, to improve vaccination rates among parents in this population, informative intervention materials should be available on social media, in books, and via accessible literature. Many studies have emphasized the important role healthcare providers play in parental decision making [19]. Therefore, it is worrisome that in the current article only 6% of mothers opposing HBV vaccine consulted medical staff prior to birth. However, this correlates with the searching nature of the mothers included in the study. We agree with the authors that the healthcare provider should utilize medical encounters to educate parents; however, the emphasis in this specific population should be on public availability of transparent scientific data, which addresses the knowledge gaps revealed in the study. Furthermore, the authors propose upholding parental education during prenatal care. This suggestion requires raising awareness of obstetricians and including them to the effort of increasing childhood vaccination rates.

Not surprisingly, Fridman et al. [8] also showed that opposition to HBV vaccination correlates with opposition to other vaccines, as parents refusing the birth dose of HBV vaccine were more likely to have not vaccinated their older children. These data are important for the design of future intervention programs.

A significant strength of the study is the follow-up telephone survey conducted with 92% of the study group, showing a vaccination catch up rate of 33% at the age of 7 weeks. We find this encouraging, since it suggests that refusal of the birth dose is not always indicative of complete vaccine opposition, and there is room for continued dialogue to change the opposing state of mind.

Although the study sheds light on an important topic, we should consider that half of the population were excluded from participation, namely the fathers. This leaves a significant gap in our understanding of the reasons for vaccine refusal, as recent studies in equalitarian societies have shown that fathers share decision making regarding newborns health. We encourage further research into the dynamics of decision making in parents of newborns.

CONCLUSIONS

In these times of resurgence of vaccine preventable diseases, we applaud the effort of Fridman et al. [8] to further our understanding of the reasons for newborn vaccine refusal. This research is the first necessary step in constructing effective interventional programs. However, to increase vaccination rates, structured informative campaigns, which are led by the Ministry of Health and medical professional societies, are necessary.

Correspondence
Dr. I. Youngster
Pediatric Infectious Diseases Unit and the Center for Microbiome Research, Shamir Medical Center (Assaf Harofeh), Zerifin 70300, Israel
email: youngsteri@shamir.gov.il

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