

Knowledge and Attitudes About Hepatitis B (HBV) Infection Among Women of Reproductive Age in China

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Abstract: *Objective:* To assess the knowledge and attitudes about hepatitis B (HBV) infection among women of reproductive age in China, exploring the factors that influence their understanding of the disease and their perceptions toward individuals infected with HBV. *Methods:* A descriptive-correlational research design was employed, using purposive sampling to select 114 women of reproductive age from a community in Shandong Province, China. Data were collected through two structured questionnaires: one assessing HBV knowledge and the other measuring attitudes toward HBV. Descriptive and inferential statistical analyses, including chi-squared tests and Spearman correlation analysis, were used to examine relationships between demographic characteristics, knowledge, and attitudes. *Results:* The majority of participants demonstrated low knowledge about Hepatitis B, with 99.1% scoring within the low knowledge range. However, respondents exhibited generally positive attitudes toward prevention and inclusion. Significant associations were found between vaccination history and better knowledge scores, as well as between familial exposure and increased knowledge and positive attitudes. A weak inverse relationship between knowledge and attitudes was observed, suggesting that higher knowledge did not necessarily correlate with more favorable attitudes. *Conclusion:* The study highlights significant gaps in knowledge about Hepatitis B among women of reproductive age, despite positive attitudes toward prevention and social inclusion. Vaccination history and familial exposure were key factors associated with better knowledge and more supportive attitudes. These findings suggest the need for targeted health education strategies that address both knowledge gaps and emotional factors to improve attitudes and enhance preventive behaviors.

Keywords: Hepatitis B (HBV); Women of reproductive age; Health knowledge; Health attitudes; Vaccination and prevention

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1. Introduction

Hepatitis B virus (HBV) infection represents a significant global public health challenge, with its widespread

prevalence and profound impact necessitating urgent attention. According to estimates by the World Health Organization, approximately 2 billion individuals worldwide have been infected with HBV, of whom 257 million have become chronic carriers. In 2019, the number of chronic hepatitis B patients reached 296 million, with 1.5 million new infections annually and approximately 820,000 deaths attributed primarily to cirrhosis and primary liver cancer ^[1]. The geographic distribution of HBV is heterogeneous, with a particularly high prevalence of chronic HBV infection among women of reproductive age in China, estimated at 5.2% to 6.7%, underscoring the need for targeted, in-depth research on this population ^[2].

Mother-to-child transmission (MTCT) constitutes a significant route of HBV transmission, posing severe risks to the health of women of reproductive age and their fetuses ^[3]. Consequently, interrupting MTCT has become a key strategy in efforts to eliminate HBV. While current interventions, including the administration of hepatitis B immune globulin (HBIG) and delivery room prophylaxis, effectively reduce the risk of MTCT ^[4], the extent of knowledge and attitudinal tendencies among women of reproductive age regarding HBV infection critically influences the adoption of preventive behaviors.

Pregnant women are particularly susceptible to HBV infection due to physiological changes during pregnancy, such as diminished immunity and increased liver burden. Additionally, emotional stress, including anxiety and depression related to concerns about fetal health, further exacerbates the challenges faced by this population ^[5]. These factors highlight the importance of examining knowledge and attitudes toward HBV infection in pregnant women.

Hepatitis B remains a pressing global health issue, and the limited research on knowledge and attitudes toward HBV infection, particularly among women of reproductive age, underscores the necessity for further investigation ^[6]. Given the pivotal role of women of reproductive age within families and society, enhancing their knowledge of HBV and fostering positive attitudes toward affected individuals are essential.

The present study seeks to evaluate the understanding of HBV and attitudes toward those infected among women of reproductive age, addressing gaps in the existing literature and adopting a multidimensional research perspective. The study's core objectives include establishing a comprehensive HBV knowledge framework for women of reproductive age, improving their preventive capabilities, assessing their attitudes toward infected individuals, promoting social acceptance of hepatitis B patients, and mitigating stigma. By advancing HBV education and guiding attitudes, this study aims to contribute to the improvement of women's health outcomes.

2. Materials and methods

2.1. Research methods

This study employed descriptive-correlational research methods, summarized as follows. It was conducted in a non-interventionist manner, without altering or manipulating the study variables and without collecting marker data that could influence the study objectives, ensuring observations were made under natural conditions. Descriptive analysis was utilized to characterize the knowledge level of hepatitis B infection and the current status of hepatitis B-related health issues among Chinese women of reproductive age, providing foundational data for future analyses. Correlation analysis was conducted to quantify the strength of relationships between variables and to identify potential causal links between knowledge and attitudes, offering a theoretical basis for public health education strategies. Overall, the descriptive-correlational approach allowed for both the observation of the current situation and the exploration of potential statistical correlations among variables, thereby providing robust data and

theoretical guidance for future research and health intervention efforts.

2.2. Purposive sampling

This study targeted 114 women of reproductive age from a specific community in Shandong Province, China. The community was selected based on its geographical proximity, which facilitated efficient fieldwork and enabled timely responses to changes, as well as the researcher's in-depth understanding of its demographics and social structure, enhancing the study's relevance and effectiveness. A purposive sampling method was employed to select participants who met predefined criteria, ensuring the collected data directly addressed the research objectives and hypotheses. This approach improved internal validity by focusing on a specific group, enabling a detailed and meaningful analysis of the target population.

2.3. Research instrument

The first research instrument collected basic demographic characteristics of the respondents, essential for analyzing the distribution of hepatitis B knowledge and attitudes across social groups. This section of the questionnaire gathered information such as age, education level, and other relevant details to identify patterns and contextualize the findings.

To evaluate hepatitis B knowledge among women of reproductive age, the "Participants' Hepatitis B Knowledge Assessment Questionnaire (PBKQ)" was developed. This questionnaire included four dimensions, each comprising three questions, covering critical aspects of hepatitis B knowledge for a total of 12 items. Each correct response earned one point, resulting in a maximum score of 12, providing a quantitative measure of the respondents' knowledge. The instrument's reliability was confirmed using Cronbach's Alpha, which yielded a score of 0.92, indicating excellent internal consistency according to Nunnally's criteria ^[7].

To assess attitudes toward hepatitis B, the study utilized the "Participants' Attitude Measurement Questionnaire for Hepatitis B (PAMHB)," designed using the Likert Scale model. Respondents rated their agreement with items related to knowledge, fear levels, social acceptance, and behavioral tendencies, with scores ranging from 4 to 1 per item. The scale comprised 12 items, yielding a maximum score of 48 and capturing the overall intensity of respondents' attitudes. The instrument's reliability was validated with a Cronbach's Alpha of 0.95, indicating excellent consistency and robustness.

2.4. Data analysis

The data collected was systematically recorded and analyzed using SPSS statistical methods. To ensure data security, all information was stored on a computer with strict confidentiality measures and used exclusively for this study. Descriptive statistics, including frequencies, percentages, mean scores, and standard deviations, were employed to summarize the data. Additionally, inferential statistical methods, such as χ^2 tests and Spearman correlation analysis, were used to examine relationships and associations between variables, providing deeper insights into the study's findings.

3. Results

In 2024, a survey was conducted to assess knowledge of and attitudes toward hepatitis B among 114 women of reproductive age from a community in Yantai, China. The results are presented below:

Table 1. Profile characteristics of respondents

Item	Frequency (f)	Percentage (%)
Age group		
19–29 years old	91	79.8
30–39 years old	16	14.0
40–49 years old	4	3.5
50–59 years old	3	2.6
Education level		
Junior high school	1	0.9
High school	30	26.3
Baccalaureate	71	62.3
Masterate	9	7.9
Doctorate	3	2.6
Vaccination history		
No	111	97.4
Yes	3	2.6
Familial exposure		
No	95	83.3
Yes	19	16.7
History of surgery		
No	78	68.4
Yes	36	31.6

Table 1 shows that the majority of respondents (79.8%) were aged 19–29 years, with smaller proportions in older age groups: 30–39 years (14.0%), 40–49 years (3.5%), and 50–59 years (2.6%). This indicates a predominantly young demographic, which may influence perceptions and experiences related to health. Most respondents had attained a baccalaureate degree (62.3%), followed by those with a high school education (26.3%). A smaller proportion had completed a master’s degree (7.9%) or a doctorate (2.6%), while only 0.9% had finished junior high school. This study revealed that 97.4% of participants had no history of hepatitis B vaccination, with only 2.6% reporting vaccination. This finding highlights a significant gap in preventive healthcare practices. Approximately 16.7% of respondents reported familial exposure to hepatitis B, while 83.3% had no such exposure. This relatively low rate of familial exposure may suggest limited direct contact with infected individuals within their immediate circles. Around 31.6% of respondents reported a history of surgery, while 68.4% did not. Surgical procedures may pose a risk of exposure to bloodborne infections, emphasizing the importance of stringent preventive measures.

Table 2. Knowledge score summary

Knowledge score	Frequency (f)	Percentage (%)
0–8 (low knowledge)	113	99.1
9–12 (high knowledge)	1	0.9
Total	114	100.0

Among the 114 respondents, 113 (99.1%) were classified as having low knowledge of Hepatitis B (scores 0–8),

while only 1 respondent (0.9%) demonstrated high knowledge (scores 9–12), as shown in **Table 2**. This finding underscores a significant gap in understanding Hepatitis B, including its transmission, symptoms, and treatment. The prevalence of low knowledge highlights the inadequacy of current health education initiatives.

Table 3. Attitudes towards hepatitis B

Attitudes towards hepatitis B	Mean (M)	Standard deviation (SD)	Verbal interpretation (VI)
Overall mean score	3.95	0.24	Strongly agree

The overall mean score of 3.95 (SD = 0.24, **Table 3**) reflects a high degree of consensus among respondents regarding positive attitudes toward Hepatitis B prevention, social inclusion, and advocacy.

Table 4. Relationship between demographic characteristics and knowledge of hepatitis B

Demographic characteristics	χ^2	Degrees of freedom (df)	P	Interpretation
Age	0.255	3	0.968	No significant relationship was observed.
Education	0.611	4	0.962	No significant relationship was observed.
History of vaccination	37.33	1	< 0.001	Significant relationship identified.
Familial exposure	5.04	1	0.025	Significant relationship identified.
History of surgery	2.19	1	0.139	No significant relationship was observed.

Chi-squared tests were conducted to assess the relationships between demographic factors (age, education, vaccination history, familial exposure, and surgical history) and knowledge levels (**Table 4**). No significant relationship was found between age and knowledge ($\chi^2 = 0.255$, $P = 0.968$) or education and knowledge ($\chi^2 = 0.611$, $P = 0.962$). A significant relationship was observed between vaccination history and knowledge ($\chi^2 = 37.33$, $P < 0.001$). Similarly, familial exposure to hepatitis B was significantly associated with higher knowledge levels ($\chi^2 = 5.04$, $P = 0.025$). No significant relationship was observed between surgical history and knowledge ($\chi^2 = 2.19$, $P = 0.139$).

Table 5. Relationship between demographic characteristics and attitudes toward hepatitis B

Demographic characteristics	χ^2	Degrees of freedom (df)	P	Interpretation
Age	16.029	15	0.380	No significant relationship was observed.
Education	7.533	20	0.995	No significant relationship was observed.
History of vaccination	61.964	5	< 0.001	Significant relationship identified.
Familial exposure	32.952	5	< 0.001	Significant relationship identified.
History of surgery	10.637	5	0.059	Marginal significance was observed.

The analysis of demographic characteristics and attitudes revealed significant relationships between vaccination history and familial exposure (**Table 5**). No significant relationship was found between age and attitudes ($\chi^2 = 16.029$, $P = 0.380$) or education and attitudes ($\chi^2 = 7.533$, $P = 0.995$). Vaccination history showed a significant association with more positive attitudes ($\chi^2 = 61.964$, $P < 0.001$), as did familial exposure ($\chi^2 = 32.952$, $P < 0.001$). Marginal significance was observed for surgical history ($\chi^2 = 10.637$, $P = 0.059$), suggesting potential

influence from frequent healthcare interactions.

Table 6. Relationship between knowledge score and attitude score

Correlation	ρ	P	Interpretation
Knowledge and attitude	-0.258	0.006	Weak inverse relationship; statistically significant.

The study identified a weak but statistically significant inverse relationship ($\rho = -0.258$, $P = 0.006$) between knowledge and attitudes toward hepatitis B (**Table 6**). Higher knowledge scores were associated with slightly less positive attitudes. This finding suggests that factors beyond knowledge, such as cultural norms, emotional influences, or personal experiences, may play a more substantial role in shaping attitudes.

The predominance of low knowledge levels among participants (99.1%) limited the ability to examine the effects of high knowledge on attitudes. These findings underscore the need for targeted educational campaigns that address not only factual knowledge but also emotional and social factors. Incorporating patient stories, peer support, and efforts to dispel misconceptions and stigma through clear communication could enhance supportive attitudes toward hepatitis B.

4. Discussion

The findings underscore critical knowledge gaps and persistent misconceptions regarding hepatitis B among respondents, highlighting deficiencies in health literacy despite relatively high levels of educational attainment. These results align with previous studies suggesting that formal education alone does not ensure a comprehensive understanding of health issues. For instance, prior research demonstrated that tertiary education correlates with improved knowledge of hepatitis B; however, significant gaps remain concerning transmission modes and treatment^[8]. Similarly, another study found that higher education levels were associated with increased vaccination uptake, yet deeper misconceptions about the disease were not adequately addressed^[9]. Limited familial exposure to hepatitis B may contribute to an underestimation of personal risk, thereby reducing awareness and the adoption of preventive behaviors. The findings of the World Health Organization also emphasize that populations exposed to comprehensive health communication programs exhibit significantly better awareness, highlighting the need for robust public health education initiatives aimed at improving knowledge and encouraging timely diagnosis and treatment^[10].

Despite significant knowledge deficits, respondents demonstrated progressive attitudes toward prevention and advocacy, consistent with the WHO's emphasis on the role of anti-stigma campaigns and educational efforts in fostering inclusion. These positive attitudes represent an opportunity to address knowledge gaps and promote effective public health interventions through targeted educational programs and community engagement initiatives^[11].

The analysis of the study reveals a complex interplay between demographic factors, knowledge, and attitudes toward hepatitis B, offering valuable insights that align with related research. Vaccination history and familial exposure were found to be significantly associated with higher knowledge levels and more supportive attitudes, underscoring the importance of personal experiences and health education in fostering awareness and empathy^[12]. Conversely, no significant associations were observed between knowledge and factors such as age, education, or surgical history, though other studies have reported positive correlations linked to healthcare interactions.

The weak inverse relationship identified between knowledge and attitudes highlights the necessity for

holistic educational strategies that integrate factual information with emotional and social elements. Empathy-driven interventions, including patient narratives and community engagement, have the potential to bridge the gap between knowledge and attitudes, address stigma, and promote inclusivity^[13]. These findings emphasize the need for public health campaigns that extend beyond mere knowledge dissemination, aiming instead to cultivate deeper understanding and drive behavior change.

5. Conclusion

The analysis identified no significant relationships between most demographic characteristics, including age and education, and attitudes toward Hepatitis B, highlighting the predominant influence of cultural and societal norms on health-related perceptions. A significant positive correlation between vaccination history and supportive attitudes suggests that vaccination programs may play a dual role in promoting both preventive behaviors and empathetic perspectives. Conversely, the weak inverse correlation observed between knowledge and attitudes reflects a complex dynamic in which increased knowledge does not consistently lead to improved attitudes. This finding underscores the need for a more nuanced approach to health education, incorporating both factual information and strategies that address emotional, cultural, and societal dimensions to effectively foster understanding and supportive attitudes.

Disclosure statement

The authors declare no conflict of interest.

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