

*Original Research*

# The Relationship of Health Belief Model Components with Hepatitis B Vaccination Compliance among Nurses at RSUD H.M. Ryacudu Kotabumi

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## ABSTRACT

**Background:** Hepatitis B remains a global health problem that can progress to cirrhosis and liver cancer. Nurses face elevated occupational exposure through contact with patients' blood and body fluids, making vaccination compliance essential, yet completion rates among health workers remain suboptimal. This study aimed to determine the relationship between Health Belief Model (HBM) components and Hepatitis B vaccination compliance among nurses at RSUD H.M. Ryacudu Kotabumi, North Lampung, in 2026. **Methods:** This analytic quantitative study used a cross-sectional design. A sample of 105 nurses was selected through proportionate stratified random sampling from a population of 173 nurses. Data were collected using a structured questionnaire adapted from validated HBM instruments and analyzed univariately, bivariate using the Chi-square/Fisher Exact test, and multivariately using multiple logistic regression. **Results:** Among the 105 respondents, 71 (67.6%) were compliant with Hepatitis B vaccination. Bivariate analysis showed significant associations between compliance and perceived susceptibility ( $p=0.003$ ), perceived severity ( $p<0.001$ ), perceived benefits ( $p<0.001$ ), perceived barriers ( $p<0.001$ ), cues to action ( $p<0.001$ ), and self-efficacy ( $p<0.001$ ). Multivariate analysis identified perceived benefits as the most dominant factor ( $p=0.003$ ; OR=13.63; 95% CI 2.39–77.71), followed by self-efficacy ( $p=0.007$ ; OR=12.44) and perceived barriers ( $p=0.004$ ; OR=0.09). **Conclusion:** HBM components are associated with Hepatitis B vaccination compliance among nurses, with perceived benefits as the most dominant determinant. Hospitals should prioritize strengthening nurses' understanding of vaccination benefits through targeted health education, workplace policy support, and continuous promotion to improve occupational vaccination coverage.

**Keywords:** Health belief model; hepatitis B; nurses; perceived benefits; vaccination compliance

## 1. INTRODUCTION

Hepatitis B vaccination compliance among health workers remains an important concern in disease prevention efforts at health care facilities. Vaccination is the primary preventive measure proven effective in providing long-term protection against Hepatitis B infection. The World Health Organization reports that approximately 296 million people live with chronic Hepatitis B infection and more than 800,000 deaths occur annually due to complications such as cirrhosis and liver cancer.<sup>(1)</sup> In Indonesia, Hepatitis B is among the ten leading causes of death from infectious disease

and is a national priority in communicable disease prevention.<sup>(2)</sup> Health workers, particularly nurses, are the most vulnerable group because they frequently have direct contact with patients' blood and body fluids.

Hepatitis B vaccination coverage among health workers in many countries remains below the expected target, with complete vaccination rates in developing countries estimated at below 70%.<sup>(1)</sup> In Indonesia, complete vaccination coverage has only reached 65–75%, still below the national target of 95%.<sup>(2)</sup> Some health workers have not even completed the full vaccination series or have never received the vaccine at all,<sup>(3)</sup> reflecting a gap between disease-prevention policy and actual behavior in the field that potentially increases transmission risk in health facilities.<sup>(4)</sup> Data from the North Lampung Regency Central Bureau of Statistics show that Hepatitis B immunization coverage in the general population reached 91.50%, yet this achievement has not been matched by vaccination compliance among health workers, who in fact face a higher risk of exposure.<sup>(5)</sup>

Compliance behavior toward vaccination is influenced not only by vaccine availability or institutional policy, but also by individual beliefs and perceptions regarding risk, benefit, and one's own capability to act. This psychological dimension is explained through the Health Belief Model (HBM), which posits that an individual's decision to undertake a health action is determined by six main components: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.<sup>(6)</sup> The model asserts that the higher the perceived risk, severity, benefits, and self-efficacy, and the stronger the cues to action combined with lower perceived barriers, the greater the likelihood that a person will undertake preventive action.

HBM was chosen for this study because it is considered most appropriate for explaining disease-prevention behavior related to individual beliefs about the risks and benefits of a health action, compared with other health-behavior models such as the Theory of Planned Behavior, which places greater emphasis on intention and social influence.<sup>(7)</sup> Previous studies have demonstrated the effectiveness of HBM in explaining Hepatitis B vaccination behavior. Alavijeh et al. found that perceived benefits and barriers significantly influenced vaccination acceptance among nurses,<sup>(8)</sup> while Munuo and Masika reported that perceived susceptibility was positively associated with vaccination compliance

among nursing students.<sup>(9)</sup> Tsai et al. showed that perceived severity and cues to action were strongly associated with preventive action among health workers,<sup>(10)</sup> while Nguyen and Tanjasiri confirmed that self-efficacy is an important predictor of vaccination intention.<sup>(11)</sup> Chen et al. further demonstrated that nurses' willingness to be vaccinated was shaped jointly by perceived benefits and barriers, underscoring the relevance of HBM across different vaccine-preventable diseases.<sup>(17)</sup>

A pre-survey of 20 nurses at RSUD H.M. Ryacudu Kotabumi, North Lampung, found that only 16 (80%) had completed the full Hepatitis B vaccination series, while 4 (20%) had not completed the third dose. This finding reinforces the existence of a vaccination-compliance problem among nurses, presumably related to various psychological factors within the HBM framework. Based on this background, the present study aimed to analyze the relationship between Health Belief Model components and Hepatitis B vaccination compliance among nurses at RSUD H.M. Ryacudu Kotabumi, North Lampung, in 2026.

## 2. METHODS

### 2.1 Study Design and Setting

This study was an analytic quantitative study with a cross-sectional observational design, aimed at analyzing the relationship between Health Belief Model components (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy) and Hepatitis B vaccination compliance among nurses. The study was conducted at RSUD H.M. Ryacudu Kotabumi, North Lampung, from 5 January to 4 April 2026.

### 2.2 Population and Sample

The study population comprised all 173 active nurses at RSUD H.M. Ryacudu Kotabumi, North Lampung. The sample size was calculated using the Lemeshow formula with a 95% confidence level and a precision of 0.1, yielding 96 respondents, to which 10% was added to anticipate drop-out, resulting in a final sample of 105 respondents. The sampling technique used proportionate stratified random sampling based on work unit, followed by simple random sampling within each stratum. Inclusion criteria comprised nurses actively working at the hospital who were willing to sign informed consent, while exclusion criteria comprised nurses with chronic liver disease.

## 2.3 Research Instrument and Data Collection

The research instrument was a structured questionnaire using a 5-point Likert scale, developed based on HBM theory and adapted from the instrument of Farias et al.,(3) with the cues-to-action and self-efficacy dimensions adjusted from Alavijeh et al.(8) The questionnaire consisted of perceived susceptibility (4 items), perceived severity (6 items), perceived benefits (11 items), perceived barriers (9 items), cues to action (4 items), self-efficacy (4 items), and vaccination compliance, measured by the number of doses received (compliant if the respondent received the full 3 doses). Validity and reliability testing were conducted on 10 nurses at RS Harapan Bunda Bandar Jaya; all 38 statement items were declared valid ( $r$  calculated  $0.739-0.825 > r$  table  $0.632$ ), with a Cronbach's Alpha of  $0.921$ .

## 2.4 Data Analysis

Scores for each variable were categorized as high/low based on the mean value of the measurement results. Data were analyzed univariately to describe frequency distribution, bivariately using the Chi-Square test (or Fisher's Exact Test when a cell had an expected frequency below 5) to test the association between each HBM component and vaccination compliance, and multivariately using multiple logistic regression to determine the most dominant HBM component associated with Hepatitis B vaccination compliance. Data analysis was conducted using SPSS version 27.

## 2.5 Ethical Considerations

This study received ethical approval from the Health Research Ethics Committee, Faculty of Health, Universitas Mitra Indonesia (Approval No. S.25/078/FKES10/2026). Prior to data collection, all prospective respondents were informed of the study objectives, procedures, and their right to withdraw at any time, and each respondent provided written informed consent before participating. Respondent data were coded, kept confidential, and used solely for the purposes of this research, in accordance with the principles of respect for persons, beneficence, non-maleficence, justice, and protection of data privacy.

# 3. RESULTS

## 3.1 Respondent Characteristics

Most respondents were in the early middle-adult age group (40–49 years), 35 people (33.3%); female, 86

people (81.9%); held a Diploma III (D3) qualification, 57 people (54.3%); and had  $\geq 5$  years of work experience, 60 people (57.1%), as presented in Table 1.

**Table 1.** Frequency distribution of respondent characteristics

| Characteristic and category          | n  | %    |
|--------------------------------------|----|------|
| Age                                  |    |      |
| Early adulthood (17–29 years)        | 22 | 21.0 |
| Transitional adulthood (30–39 years) | 34 | 32.4 |
| Early middle adulthood (40–49 years) | 35 | 33.3 |
| Late middle adulthood (50–59 years)  | 14 | 13.3 |
| Sex                                  |    |      |
| Male                                 | 19 | 18.1 |
| Female                               | 86 | 81.9 |
| Education                            |    |      |
| Diploma III (D3)                     | 57 | 54.3 |
| Bachelor's (S1)                      | 29 | 27.6 |
| Registered Nurse (Ners)              | 19 | 18.1 |
| Work Duration                        |    |      |
| < 5 years                            | 45 | 42.9 |
| $\geq 5$ years                       | 60 | 57.1 |

## 3.2 Distribution of Health Belief Model Components and Vaccination Compliance

The frequency distribution of HBM components showed that most respondents had low perceived susceptibility (59.0%), whereas perceived severity (56.2%), perceived benefits (52.4%), perceived barriers (50.5%), and cues to action (52.4%) tended to be high, while self-efficacy was mostly in the low category (51.4%). A total of 71 respondents (67.6%) were classified as compliant with Hepatitis B vaccination, while 34 respondents (32.4%) were non-compliant, as presented in Table 2.

## 3.3 Bivariate Analysis

Chi-Square and Fisher's Exact Test results showed that all HBM components were significantly associated with Hepatitis B vaccination compliance ( $p < 0.05$ ). Perceived benefits showed the strongest association, with  $OR=47.11$  (95% CI 10.25–216.56), followed by self-efficacy with  $OR=35.64$  (95% CI 7.84–162.05). Perceived barriers showed a negative association, with  $OR=0.04$  (95% CI 0.01–0.16), indicating that nurses with high perceived barriers had a much lower likelihood of being compliant with vaccination. Full results are presented in Table 3.

**Table 2.** Frequency distribution of health belief model components and hepatitis B vaccination compliance

| Variable                           | Category      | n  | %    |
|------------------------------------|---------------|----|------|
| Perceived susceptibility           | Low           | 62 | 59.0 |
|                                    | High          | 43 | 41.0 |
| Perceived severity                 | Low           | 46 | 43.8 |
|                                    | High          | 59 | 56.2 |
| Perceived benefits                 | Low           | 50 | 47.6 |
|                                    | High          | 55 | 52.4 |
| Perceived barriers                 | Low           | 52 | 49.5 |
|                                    | High          | 53 | 50.5 |
| Cues to Action                     | Low           | 50 | 47.6 |
|                                    | High          | 55 | 52.4 |
| Self-efficacy                      | Low           | 54 | 51.4 |
|                                    | High          | 51 | 48.6 |
| Hepatitis B vaccination compliance | Non-compliant | 34 | 32.4 |
|                                    | Compliant     | 71 | 67.6 |

### 3.4 Multivariate Analysis

All HBM components that were significant in the bivariate analysis were entered into the multiple logistic regression model. The Omnibus Test result indicated that the model was significant ( $p=0.000$ ), with a Nagelkerke R Square of 0.694, meaning the model explained 69.4% of the variation in Hepatitis B vaccination compliance. The Hosmer and Lemeshow test showed  $p=0.509$ , indicating the logistic regression model had good fit with the data. Multivariate analysis showed that perceived benefits, self-efficacy, and perceived barriers remained significant after controlling for other variables, with perceived benefits as the most dominant factor ( $OR=13.63$ ; 95% CI 2.39–77.71), as presented in Table 4.

**Table 3.** Association between health belief model components and hepatitis B vaccination compliance

| HBM component            | Category | Compliant, n(%) | Non-compliant, n(%) | p-value | OR (95% CI)          |
|--------------------------|----------|-----------------|---------------------|---------|----------------------|
| Perceived susceptibility | High     | 36 (83.7)       | 7 (16.3)            | 0.003   | 3.97 (1.53–10.29)    |
|                          | Low      | 35 (56.5)       | 27 (43.5)           |         |                      |
| Perceived severity       | High     | 49 (83.1)       | 10 (16.9)           | <0.001  | 5.35 (2.19–13.05)    |
|                          | Low      | 22 (47.8)       | 24 (52.2)           |         |                      |
| Perceived benefits       | High     | 53 (96.9)       | 2 (3.6)             | <0.001  | 47.11 (10.25–216.56) |
|                          | Low      | 18 (36.0)       | 32 (64.0)           |         |                      |
| Perceived barriers       | High     | 22 (41.5)       | 31 (58.5)           | <0.001  | 0.04 (0.01–0.16)     |
|                          | Low      | 49 (94.2)       | 3 (5.8)             |         |                      |
| Cues to Action           | High     | 46 (83.6)       | 9 (16.4)            | <0.001  | 5.11 (2.07–12.63)    |
|                          | Low      | 25 (50.0)       | 25 (50.0)           |         |                      |
| Self-efficacy            | High     | 49 (96.1)       | 2 (3.9)             | <0.001  | 35.64 (7.84–162.05)  |
|                          | Low      | 22 (40.7)       | 32 (59.3)           |         |                      |

The Chi-Square test was used for perceived susceptibility, perceived severity, and cues to action; Fisher's Exact Test was used for perceived benefits, perceived barriers, and self-efficacy.

**Table 4.** Multivariate analysis of health belief model components on hepatitis B vaccination compliance

| Variable                 | p-value | OR    | 95% CI |       |
|--------------------------|---------|-------|--------|-------|
|                          |         |       | Lower  | Upper |
| Perceived benefits       | 0.003   | 13.63 | 2.39   | 77.71 |
| Self-efficacy            | 0.007   | 12.44 | 1.99   | 77.63 |
| Cues to Action           | 0.655   | 1.38  | 0.33   | 5.78  |
| Perceived severity       | 0.659   | 1.37  | 0.34   | 5.64  |
| Perceived susceptibility | 0.763   | 1.27  | 0.27   | 6.04  |
| Perceived barriers       | 0.004   | 0.09  | 0.02   | 0.47  |

## 4. DISCUSSION

The results showed that perceived susceptibility was significantly associated with Hepatitis B vaccination compliance ( $p=0.003$ ;  $OR=3.97$ ). This finding is consistent with the study by Getnet et al., which showed that health workers who perceived themselves at high risk of

Hepatitis B exposure through contact with patients' blood or body fluids tended to be more compliant with vaccination.<sup>(12)</sup> Nurses' awareness of the possibility of exposure during health service delivery can increase motivation to undertake self-protective action. This is consistent with a national survey in Indonesia, which

found that perceived risk of Hepatitis B infection was the strongest driver of adult vaccination willingness.<sup>(18)</sup>

Perceived severity was also significantly associated with vaccination compliance ( $p < 0.001$ ;  $OR = 5.35$ ). Individuals who viewed Hepatitis B as a disease with serious consequences, such as cirrhosis and liver cancer, tended to have higher motivation to undertake prevention.<sup>(12)</sup> Understanding the long-term impact of the disease is an important driver for health workers to complete their vaccination doses, in line with findings among nurses in Ethiopia where awareness of disease severity was linked to higher Hepatitis B vaccination coverage.<sup>(21)</sup>

Perceived benefits showed the strongest association in the bivariate analysis ( $OR = 47.11$ ) and remained the most dominant factor in the multivariate analysis ( $OR = 13.63$ ; 95% CI 2.39–77.71). This finding is consistent with the study by Munuo and Masika, which confirmed that high perceived benefits of a preventive action play an important role in increasing compliance with recommended health behavior,<sup>(9)</sup> and with the study by Farias et al., which showed that belief in vaccine benefits is an important factor contributing to increased vaccination coverage among high-risk groups.<sup>(3)</sup> Limbu and Gautam also confirmed that perceived benefits are a strong predictor in shaping vaccination behavior, because individuals more readily accept a health intervention when they believe it produces real and worthwhile results.<sup>(7)</sup> Similarly, Chen et al. found that nurses' willingness to receive recommended vaccines was strongly shaped by their perception of vaccine benefits relative to perceived barriers.<sup>(17)</sup>

Perceived barriers were negatively associated with vaccination compliance ( $OR = 0.04$  in the bivariate model;  $OR = 0.09$  in the multivariate model), indicating that the higher the perceived barriers—such as time constraints, concerns about side effects, and lack of workplace support—the lower the likelihood that nurses would complete vaccination. This finding is consistent with studies showing that structural barriers such as limited vaccine access and insufficient education programs can reduce Hepatitis B vaccination coverage among health workers.<sup>(13)</sup> A mixed-methods study in Indonesia similarly identified cost, distance, and limited availability of vaccination services as key barriers to Hepatitis B vaccine uptake.<sup>(19)</sup>

Cues to action were also significantly associated with vaccination compliance ( $p < 0.001$ ;  $OR = 5.11$ ), although no longer significant in the final multivariate

model. Workplace support, ongoing health education, and institutional policy have been shown to act as triggering factors that encourage health workers to undertake preventive action.<sup>(14,15)</sup> Meanwhile, self-efficacy was strongly associated with vaccination compliance in both the bivariate ( $OR = 35.64$ ) and multivariate analyses ( $OR = 12.44$ ;  $p = 0.007$ ), confirming that individual confidence in one's own ability to complete the vaccination series is an important predictor, consistent with previous studies.<sup>(11,16)</sup> A study among healthcare workers in Nigeria likewise reported that self-efficacy and psychosocial readiness were important predictors of Hepatitis B vaccine adherence.<sup>(23)</sup>

Overall, the multivariate analysis confirmed that perceived benefits is the most dominant HBM component associated with Hepatitis B vaccination compliance among nurses at RSUD H.M. Ryacudu Kotabumi, North Lampung. The effectiveness of the Hepatitis B vaccine increases with dose completeness, with a full three-dose series providing more than 90% protection against infection,<sup>(1)</sup> making the strengthening of health workers' belief in vaccination benefits a key strategy for improving vaccination compliance overall.

This study has several limitations. First, the cross-sectional design does not allow causal relationships to be established between HBM components and vaccination compliance. Second, the study was conducted at a single hospital, so the findings may not be generalizable to nurses in other facilities or regions with different institutional policies and vaccine access. Third, vaccination compliance was based on respondents' self-reported number of doses received rather than verified medical records, which may introduce recall or social-desirability bias. Future studies using multi-center samples, longitudinal designs, and verified vaccination records are recommended to confirm these findings.

## 5. CONCLUSION

Health Belief Model components were significantly associated with Hepatitis B vaccination compliance among nurses at RSUD H.M. Ryacudu Kotabumi, North Lampung, in 2026. All six HBM components—perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy—were significantly associated with compliance in the bivariate analysis, while in the multivariate analysis perceived benefits was the most dominant factor associated with vaccination compliance ( $OR = 13.63$ ), followed by self-

efficacy and perceived barriers. Improving health workers' understanding of the benefits of Hepatitis B vaccination, through health education, socialization of vaccination programs, and strengthening of hospital institutional policy, should be a primary focus in efforts to improve vaccination compliance and protect nurses from the risk of Hepatitis B infection in the workplace.

## Ethical Approval

This study received ethical approval from the Health Research Ethics Committee, Faculty of Health, Universitas Mitra Indonesia (Approval No. S.25/078/FKES10/2026).

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## Competing Interests

All the authors declare that there are no conflicts of interest.

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No funds were received for this study.

## Underlying Data

Derived data supporting the findings of this study are available from the corresponding author on request.

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