



Hepatitis B Vaccine Acceptability among Nurses: A Theory Based Conceptualization

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ABSTRACT

BACKGROUND

Hepatitis B is the most common occupational disease in health care providers. It can be followed by several complications. The aim of this study was to determine the cognitive determinants of hepatitis B (HB) vaccination Acceptability among nurses based on the Health Belief Model (HBM).

METHODS

This cross-sectional study was conducted among 330 nurses in educational hospitals of Kermanshah city, during 2016. Samples were randomly selected with the proportional to size among different educational hospitals in Kermanshah. A structured questionnaire was applied for collecting data and data were analyzed using SPSS software version 16 by using bivariate correlations and logistic regression statistical tests.

RESULTS

The mean age of the respondents was 30.5 years [SD: 6.62]. About, 58.5% of the participants reported to have completed (three times) vaccination of HB. Female nurses were more likely to be fully vaccinated against HB than male nurses, with adjusted odds ratio estimate of 2.507 [95% CI: 1.523-4.125] and those who had family or friends with a history of HB with odds ratio estimate of 3.706 [95% CI: 1.317-10.425], making these the most influential predictive determinants for full uptake (three time) of HB vaccination. Among the HBM variables: perceived threat with odds ratio estimate of 1.264 [95% CI: 1.160-1.376], perceived self-efficacy with odds ratio estimate of 1.179 [95% CI: 1.020-1.363], and cues to action with odds ratio estimate of 1.335 [95% CI: 1.015-1.756], were the more influential predictors of full uptake (three time) of HB vaccination.

CONCLUSION

To development uptake vaccination programs promotion in addition to focusing on male nurses, using the results of the predictive constructs include; perceived threat perceived self-efficacy suggested. Based on our result, it seems that development and implementation of health promotion programs to increase threat about side effect of HB and self-efficacy regarding HB vaccination uptake may be usefulness of the findings to promotion of vaccination of HB.

KEYWORDS:

Health promotion, Health education, Public health, Behavioral medicine

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Received: 25 May 2018

Accepted: 10 Sep. 2018

Please cite this paper as:

Mirzaei Alavijeh M, Vaezi M, Jalilian F. Hepatitis B Vaccine Acceptability among Nurses: A Theory Based Conceptualization. *Middle East J Dig Dis* 2019;11:45-51. doi: 10.15171/mejdd.2018.127.

INTRODUCTION

Hepatitis B (HB) is the cause of many acute and chronic infections, liver cirrhosis, and liver cancer worldwide.¹ HB is the most common occupational disease in health care providers and its annual incidence in hospital staff is about two to ten times more than that of the general population.² Vaccination



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is a very appropriate strategy to prevent HB virus (HBV) infection.³ Chronic infection with HB is still one of the most important public health issues in the world despite the presence of effective vaccines and strong antiviral treatments. During 1990-2014 Iran had a 3% prevalence of HB, according to Mohammadi and colleagues.⁴ In 2014, the 67th World health assembly emphasized the need for monitoring the prevention, diagnosis, and treatment of viral hepatitis.⁵ For this purpose, accurate epidemiological information at the national level is necessary to assess the impact of implemented strategies.⁶ Iran has a moderate prevalence of HBV.⁷ The prevalence of chronic HB infection is 1.7%. Therefore, with the aim of preventing HB, vaccination of high-risk groups, including health care workers in Iran, began in 1993, but the results of a survey of various HB vaccination coverage in health care workers showed rates between 52.7% and 87.2%.⁸ Therefore, considering the full implementation of the HB vaccination program among health care providers, it is necessary to examine the beliefs associated with performing this health behavior, which can guide specialists in planning vaccination promotion programs.⁹⁻¹¹

Social-cognitive determinants are among the main causes of behavior change, and these determinants are dependent on factors such as past experiences and socio-cultural processes.¹¹ Recognition of health behavior change practitioners and using the theory-based approaches regarding to how people behave and what beliefs play roles in encouraging people to perform certain behaviors can help researchers to plan effective interventional programs.¹² One of the common models in health behavior research is the Health Belief Model (HBM) that has been used in many research studies related to health behaviors.^{13,14} This model investigates individual perceptions and beliefs about health issue based on which individuals must have perceived susceptibility to take preventive actions, then understand the depth of this risk and the seriousness of various physical and mental complications of the problem (perceived severity). If they have a positive analysis on the benefits of preventive behavior (perceived benefits), which perceived severity and benefits also called perceived threat, and the lack of serious barriers (perceived barriers) and receiving the environmental guides (cues to action), and ultimately having an understanding and confidence of adoption of the intended

behavior (perceived self-efficacy).¹² Regarding the determinants influencing the HB vaccine, de Wit and colleagues have investigated the effective role of perceived sensitivity and severity of HB vaccine.¹¹ Several studies have also shown that determinants such as low perceived severity, or lack of awareness and lack of belief in the efficacy of the vaccine are effective in declining the vaccine.¹⁵⁻¹⁷ Van den Dool and co-workers also showed that perceived susceptibility is a strong predictor of the intention to receive an influenza vaccine.¹⁸ On the other hand, studies have shown that almost 90% of personnel are aware of HB vaccination, but only 56.5% of them completed their vaccination program, and it seems that the current level of HB vaccination is not sufficient to protect healthcare workers against HB.^{19,20}

In order to increase vaccination uptake, it seems that determining the predictors affecting the overall performance of HB vaccination in Iranian society is essential and can provide useful findings to health planners.²¹

The aim of our study was to determine the cognitive determinants of HB vaccination uptake among Iranian nurses based on the HBM.

MATERIALS AND METHODS

Participants and procedure

This cross-sectional study was conducted among 330 nurses in educational hospitals affiliated to Kermanshah University of Medical Sciences (KUMS), in 2016. The sample size was calculated at 95% significant level according to the results of a pilot study. The pilot study's finding indicated 29% of participants reported to have completed (three times) vaccination of HB, so a sample of 330 was estimated.

For appropriate sampling included educational hospitals (Imam Reza, Imam Ali, Imam Khomeini, Farabi, and Taleghani) were considered as the clusters and samples were selected by appropriate assignment of each class according to the number of nurses in each hospital. Coordination with the authorities of KUMS and managers of educational hospitals was done. Using a simple random sampling method, the participants were selected and the questionnaire designed for this purpose was given to them to complete as self-report.

The nurses who worked in Kermanshah educational hospitals were eligible to participate in this study. This

study has been approved by the institutional review board at the KUMS (KUMS.REC.1395.746).

Of the total 330 nurses, 299 (99.7%) signed the consent form and voluntarily agreed to participate in this study.

Measures

The data collection tool included three sections.

1. Demographic variables

The first part contained information about five subjects including age (years), sex (male, female), level of education (apprentice, expert, master's degree), work experience (number of years), and history of HB infection among the family or friends (yes, no).

2. History of HB vaccination

The second part included a question regarding the HB vaccination among the participants; "how many times have you received the HB vaccine (I did not receive it, one, two, and three times)?"

3. Items of HBM Construct

The third part included items about the five constructs of HBM. The questionnaire was used by the research team using the patterns.^{10,11} In order to facilitate participants' responses to the items of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy, all items were standardized to a five-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). Furthermore, the response category was designed yes or no for cues to action.

Five items were designed to measure perceived threat from side effects of HB infection (e.g., "HB infection can lead to liver cancer."). Four items were designed to measure perceived benefit of uptake HB vaccine (e.g., "uptake of HB vaccine helps me to prevent HB infection."). Four items to evaluate perceived barrier to uptake HB vaccine (e.g., "lack of sufficient time to uptake HB vaccine"). Three items were designed for cues to action to uptake HB vaccine (e.g., "Do your family members encourage you to uptake HB vaccine?"). Three items were designed to measure self-efficacy regarding HB vaccination (e.g., "I am confident I can gather information about HB vaccination."). The Cronbach's alpha for the abovementioned constructs were as follows: perceived threat ($\alpha = 0.85$);

perceived barrier ($\alpha = 0.82$), perceived benefit ($\alpha = 0.74$), perceived self-efficacy ($\alpha = 0.78$), and cues to action ($\alpha = 0.65$) attesting to the internal consistency of the measures.

The content validity was confirmed by an expert group and a questionnaire was used to assess the validity of the questionnaires. A preliminary study was conducted on 30 participants. Using the Cronbach's alpha and split half test, the reliability of the questionnaires was as follows.

Statistical Analysis

The Statistical Package for the Social Sciences software (SPSS-16) was used for the purpose of data entry, and analysis. Descriptive statistics were used to summarize and organize the data. Bivariate correlations were computed to ascertain the magnitude and direction of the associations between the HBM variables. Backward Wald stepwise multiple logistic regression analysis was performed to predict the HB vaccination on the basis of HBM variables of 1) perceived threat, 2) perceived barrier, 3) perceived benefit, 4) cues to action, and 5) self-efficacy. In addition, stepwise multiple logistic regression analysis was performed to predict the HB vaccination on the basis of background variables. Cronbach's Alpha and split half was used to estimate the internal consistency of the various measures.

RESULTS

The mean age of the respondents was 30.5 years [SD: 6.62], ranged from 20 to 58 years. In addition, the mean job history of respondents was 79.91 months [95% CI: 72.29, 87.54], ranged from 2 to 360 months. 34.8% (104/299) of the participants were men, and 65.2% (195/299) were women. Nearly 5% (15/299), 90% (269/299), and 5% (15/299) of the respondents reported to be a technician, BSc and MSc, respectively. 8.4% (25/299) of the respondents had positive family or friends history of HB. Furthermore, 58.5% (175/299) of the participants reported to have completed (three times) vaccination against HB. In addition, 45.2% (47/104) and 65.6% (128/195) of men and women reported to have completed (three times) vaccination against HB, respectively.

Table 1 shows the Zero-order correlations. Significance levels at the 0.01 and 0.05 were the criteria for the analysis. The bivariate assessment of variables revealed that there were signs of multicollinearity among HBM

Table 1: Correlation between different components of HB

Components	Mean (SD)	Range	X1	X2	X3	X4
X1. Perceived threat	19.58 (3.88)	5-25	1			
X2. Perceived benefit	15.82 (2.66)	4-20	0.208**	1		
X3. Perceived barrier	13.23 (3.66)	4-20	-0.130*	-0.132*	1	
X4. Perceived self-efficacy	12.26 (1.99)	3-15	0.369**	0.333**	-0.047	1
X5. Cues to action	1.95 (0.96)	0-3	0.173**	0.162**	-0.091	0.149*

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 2: Associations between HBM components and HB vaccination uptake

Components	Vaccination uptake	Mean (SD)	t	Sig
Perceived threat	Not Fully	17.65 (4.60)	- 7.955	< 0.001
	Fully	20.94 (2.50)		
Perceived benefit	Not Fully	15.49 (2.72)	- 1.835	0.068
	Fully	16.06 (2.60)		
Perceived barrier	Not Fully	13.58 (3.37)	1.378	0.169
	Fully	12.98 (3.84)		
Perceived self-efficacy	Not Fully	11.60 (2.19)	- 4.996	< 0.001
	Fully	12.73 (1.69)		
Cues to action	Not Fully	1.73 (1.11)	- 3.180	0.002
	Fully	2.10 (0.81)		

Table 3: Multiple logistic regression analysis for socio-demographic characteristics related to complete (three times) vaccination of HB (final model. Step 4)

Variables		Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Sex	Male	1	-	1	-
	Female	2.31 (1.42 – 3.76)	0.001	2.50 (1.52 – 4.12)	< 0.001
Positive family or friends history of HB	No	1	-	1	-
	Yes	3.07 (1.12 – 8.42)	0.029	3.70 (1.31 – 10.42)	0.013

variables. The findings indicate that for the sample, perceived threat was significantly correlated to self-efficacy ($r = 0.369$), benefit ($r = 0.208$), and cues to action ($r = 0.173$), while inversely correlated with barrier ($r = -0.130$). Self-efficacy was significantly correlated to benefit ($r = 0.333$), and cues to action ($r = 0.149$), but there was no significant correlation between self-efficacy and barrier ($r = -0.047$). Barrier was significantly inversely correlated to benefit ($r = -0.132$), also there was no significant correlation between barrier and cues to action ($r = -0.091$). Benefit was significantly related to cues to action ($r = 0.162$).

As can be seen in table 2, means of perceived threat, perceived self-efficacy, and cues to action among nurses who are fully vaccinated were significantly higher than

those who are not. Furthermore, there were no significantly associations between perceived benefit and perceived barrier with HB vaccination uptake.

Logistic regression (backward stepwise method) building procedure was conducted and finally on 4th step the procedure was stopped and the best model was selected. Among the socio-demographic determinants, female sex with adjusted odds ratio estimate of 2.507 [95% CI: 1.523-4.125] and positive family or friends history of HB with odds ratio estimate of 3.706 [95% CI: 1.317-10.425] were the most influential predictive determinants for doing complete (three times) HB vaccination (table 3).

As mentioned in statistical analyses, a step-wise model building procedure was conducted and finally on

Table 4: Multiple logistic regression analysis for HBM variables related to doing complete (three times) vaccination of HB (final model. Step 3)

Components	B	S.E.	Odds Ratio	95% Confidence intervals		P value
				Lower	Upper	
Perceived threat	0.234	0.044	1.26	1.16	1.37	< 0.001
Perceived self-efficacy	0.165	0.074	1.17	1.02	1.36	0.026
Cues to action	0.289	0.140	1.33	1.01	1.75	0.039

3rd step the procedure stopped and the best model was selected. Among the HBM variables perceived threat with odds ratio estimate of 1.264 [95% CI: 1.160-1.376], perceived self-efficacy with odds ratio estimate of 1.179 [95% CI: 1.020-1.363], and cues to action with odds ratio estimate of 1.335 [95% CI: 1.015-1.756] are the most influential predictors of doing complete (three times) vaccination of HB.

DISCUSSION

The aim of this study was to determine the predictive determinants for performing a complete vaccination of HB among nurses in educational hospitals in Kermanshah, affiliated to KUMS. The findings of the study showed that 58.5% of the participants had a history of HB vaccination. This finding is largely in accordance with the findings of Kusic-Tepavcevic and colleagues among healthcare providers in Serbia, who reported an acceptance rate of HB vaccination (66.2%).²² Tibdewal and colleagues also reported that among medical and dental students in India, 55.9% of them completed the immunization program against HB.²³ Since the nurses are a member of the care team and a large part of the medical community, and given the wide range of care and professional roles in different departments of hospitals, the risk of occupational injury is higher and it is expected that they have better preventive behaviors. But our findings indicated that 41.5% of them had not fully vaccinated against HB, which could be a warning sign to health policy makers in Iran, and the need for more attention to this issue and the identification of factors determining behaviors for planning the training programs more precisely.

Our findings showed that sex was a predictor of receiving the HB vaccine as the proportion of receiving HB vaccination was higher among women. In this regard, sex was introduced as one of the social determinants of health. Sexual roles and norms affect the access of

women and men to health services and how health systems respond to their different needs.²⁴ On the contrary, the findings of this study have shown in several studies that women have an unfavorable situation in terms of access to health services.²⁵⁻²⁷ In this regards Gonzales found women more willing than men to seek out HB information, which may explain women's higher rates of immunization.^{28,29} In addition, it should be noted that Iran is one of the countries with a high level of attention to the health of women, and there are many programs regarding the provision of women's health services in Iran.³⁰ It seems that in educations related to promotion of health services in Iran, special attention should be paid to men.

Other finding of the present study is the more chance of nurses who have had a history of becoming acquainted with a patient with HB to receive HB vaccination. In many cases, screening and health promoting behaviors have been reported among people living with a patient in their family or friends.^{31,32} They are likely to have higher sensitivity, and hence have more preventative behaviors.

The perceived threat, perceived self-efficacy, and guidance for action were the most important predictors of HB vaccination. In this regard, the study by Grace in Vietnamese immigrants also showed a high perceived sensitivity to HB and vaccination against it.³³ In the study by Youafzai and colleagues, which focused on health care workers in the Pakistani suburbs, perceived severity structures were more important and a stronger predictor of needle stick prophylaxis.³⁴ De Wit and others in their study investigated the cognitive determinants affecting the HB vaccination among men who had sex with men using the HBM and the theory of plan behavior. They reported in their study that men who received uptake a HB vaccine had higher significantly perceived risk of HB.¹¹ Brewer and colleagues also showed that susceptibility and severity were predictors of receiving vaccination in their meta-analysis.³⁵ It seems that due to eliminating the

perceived benefits and barriers of the model in anticipation of receiving HB vaccination, may be the familiarity of nurses with regard to HB disease and strategies for coping with perceived barriers, and therefore fewer barriers to adopting prevention behaviors. According to the findings of this study, it seems that the more use of external action guides in promoting the threat and perceived self-efficacy of nurses, in order to increase the probability of decision making for the preventive behavior of HB disease; service managers of nursing and education officials in hospitals should pay attention to these determinants during the training programs, then they can expect to be proactive in preventing HB disease.

This study had a few limitations. First, the study was retrospective in nature and relied heavily on recollection of past events. Second, the information is based on self-reporting, which always faces the risk of recall bias and we do not know how it could have affected the results. Third, the internal consistency of the questionnaire was relatively low ($\alpha = 0.65$) for assessing cues to action. Finally, the high rejection rate is another limitation of our study.

The findings of this study suggest the following for the development of vaccination promotion programs: given the lower uptake of HB vaccination among male nurses, more attention needs to be paid to their vaccination uptake. The authors suggest the use of fear appeal behavioral change methods with emphasizing the promotion of self-efficacy, and in the interpersonal using of descriptive and perceptual norms behavioral change methods.

ACKNOWLEDGEMENTS

This article is a part of research project supported by KUMS, Kermanshah, Iran. We would like to thank deputy of research of KUMS for financial support of this study.

ETHICAL APPROVAL

There is nothing to be declared.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

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