

## **Determinants of Willingness to Pay for Hepatitis B Vaccination in Malaysia**

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### **ABSTRACT**

Hepatitis B infection is an upcoming health problem in Malaysia. HB vaccine coverage of infants in Malaysia was implemented by the Malaysian government in 1989. However, there is no compulsory vaccination programme for adults for HB vaccination. Currently, they have to protect themselves with a self-paid HB vaccination. The determinant of willingness to pay for HB vaccination is important to examine in order to estimate the economic benefit of high-burden diseases, such as HB. This study includes a few determinants identified by a literature review and an added new variable as risk behaviour to determine willingness to pay.

*Keywords:* Health Belief Model, Hepatitis B, vaccination, willingness to pay

### **INTRODUCTION**

Hepatitis results in an inflammation of the liver caused by a viral infection. The World Health Organisation estimated that 240 million humans were chronically infected by HBV and globally, 240 million are chronically infected, while 650,000

individuals die each year due to liver cirrhosis (World Health Organisation, 2015). In Malaysia, an estimated one million nationals are chronically infected with the Hepatitis B virus (Khairullah & Merican, 2004). The HB vaccine coverage of infants in Malaysia under the Expanded Programme on Immunisation (EPI) was implemented by the Malaysian government in 1989 (Khairullah & Merican, 2004; Ng et al., 2005). However, in Malaysia currently, there is no compulsory vaccination programme for adults for HB vaccination. Their willingness to pay for a self-paid HB vaccination and

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the factors affecting their willingness to pay (WTP) are important to examine in order to estimate the economic benefit of vaccination for high-burden diseases, such as Hepatitis B. Since only a few studies (Hou et al., 2014; Pennie et al., 1991) focus on willingness to pay for existing vaccination, this study will identify the determinant for willingness to pay for a HB vaccination.

### **Rationale of the Study**

Belief pertaining to safety and efficiency of vaccines is the most important factor in determining vaccine acceptance (Bodenheimer et al., 1986). However, some studies highlighted that doctor recommendation is important for increasing vaccine coverage among high risk populations (Kee et al., 2007). Nevertheless, Larson et al. (2011) highlighted that public trust in vaccination always changes and depends on vaccine perception, vaccine risk experience of getting vaccines, religious or political circumstances and socioeconomic status. Sustained vaccine coverage works only if public confidence in vaccines and the public's level of trust in vaccination increases (Larson et al., 2011).

The information on willingness to pay for an existing vaccination is important in policy-making decisions as it helps in gathering information about diseases and the fiscal burden it places on individuals in addition to providing vaccines with cost-controlled efficiency (Hou et al., 2014). Current literature does not provide an estimate of the benefit of vaccinations after

a vaccine is introduced. Information on the acceptable levels of vaccination in the past is also lacking (Piso & Wild, 2009).

## **RESEARCH FRAMEWORK AND HYPOTHESIS SPECIFICATION**

### **Socioeconomic Factors**

In general, most studies conducted include the socioeconomic variable as one of the components in determining a customer's willingness to pay. Because Malaysia is a multiracial country, this research intends to test the racial significance difference. Several studies conducted in Malaysia show that the Chinese have a higher chance of infection compared to other races (Lopez et al., 1978; Tan et al., 1986, 1990). Hebert and his co-researchers also highlighted that race and ethnicity "play a small role" in vaccination as the rate of vaccination was shown to be low among at least one ethnic group, African-Americans (Hebert et al., 2005).

Basic economic models often focus on two determinants of willingness to pay, which are income and use of goods (Liebe et al., 2011). When consumers consider paying for improved health quality, their choices and responses are based on their disposable income. Therefore, income usually has a positive relationship to willingness to pay (Cawley, 2008; Do et al., 2006; Kartman et al., 1996; Lucas et al., 2007; Unutzer et al., 2003). Studies conducted in Sweden showed that lower-income patients preferred to finance their WTP via loans and have higher WTP for the treatment of obesity

compared to higher-income patients (Narbro & Sjoström, 2000). For cardiovascular disease in Sweden, factors such as income, condition of pectoris status, attack rate and percentage in reduction in attack rates were positively related to willingness to pay (Kartman et al., 1996). Sometimes, willingness to pay correlates with income, tax burden and political persuasion for obesity in New York (Cawley, 2008). For cholera vaccine in Mozambique, private demands for a vaccine depended on lower price, higher income, increase in asset ownership, education and higher risk group (Lucas et al., 2007). In Western Washington, patients with higher risk and higher income were able to pay more for higher depression symptoms (Unutzer et al., 2003).

One of the studies conducted on allergy-asthma in Denmark showed that education and age were barriers for willingness to pay, but not income. Another determinant of willingness to pay is gender. Gender is also one of the important variables in HIV and malaria vaccine studies (Sauerborn et al., 2005; Whittington et al., 2008). In India, the willingness to pay for HIV-positive treatment was lower for women compared to men (Gupta & Sankar, 2003). Therefore, it was postulated that if one had good socioeconomic status, one would be more willing to pay for HB vaccination.

**Hypothesis 1:** Socioeconomic status has a positive effect on willingness to pay for HB vaccination.

### **Knowledge Level**

Public goods can be expressed in the economic concept of value. When an individual uses goods to increase his/her wellbeing, he/she shows direct connection between himself/herself and the goods in terms of 'use value'. Moreover, if goods do not have a link to an individual's wellbeing, but to his/her knowledge, there is an indirect connection that is expressed as 'non-use value' (Liebe et al., 2011).

Knowledge context, source of information, HB transmission and vaccine existence will be tested. Results from Ma et al. (2006) showed that the healthcare provider is the main influence on the rate of HB immunisation. In another study conducted in France, the researchers suggested that knowledge of HB transmission among households was very poor and should be improved, especially for higher risk groups (Brouard et al., 2013).

Despite the high willingness to pay for several non-available vaccines such as for dengue and HIV, this study attempts to investigate willingness to pay in the presence of a readily available Hepatitis vaccine in the market (Palanca, 2008; Whittington et al., 2008). Lack of knowledge among parents (Smith et al., 2011; Becker et al., 1978) was found to be one of the factors influencing willingness to pay. Knowledge level among the targetted population highlighted that knowledge can influence Hepatitis B vaccination coverage (Bodenheimer et al., 1986; Ma et al., 2007; Slonim et al., 2005). Therefore, it was hypothesised that if one

had a high level of knowledge of Hepatitis B, one would be more willing to pay for Hepatitis B vaccination.

Hypothesis 2: High level of knowledge of Hepatitis B has a positive effect on willingness to pay for HB vaccination.

### **Awareness**

Although awareness of Hepatitis B variables has been investigated in the Malaysian context, it only focussed on healthcare workers in general (Hesham et al., 2005; Lim & Rashwan, 2003; Sinnah et al., 1994; Yaacob & Samaranayake, 1989). Initially, a plasma-derived HB vaccine was not widely accepted by Malaysian dental practitioners due to the fear of side effects (Yaacob & Samaranayake, 1989) even though it was found to be safe and immunogenic by the Korea Green Cross Corporation (Sinnah et al., 1994). Even though employees in the medical sector were aware of the seriousness of this disease, not all of them were immunised against the HB virus (Hesham et al., 2005). Lim and Rashwan (2003) discovered that HB vaccination coverage was lower among the public (below 35%), but higher among healthcare workers at 65.6%. This outcome affirmed the findings of Hesham et al. (2005); in their study, 58.4% of healthcare workers took the complete vaccine schedule and 82.2% of them took at least one dose. Healthcare workers seem to be reluctant to complete a full vaccine schedule despite having a higher level of awareness compared to the

general public. Nevertheless, in Nigeria, although healthcare workers were found to have substantial knowledge of Hepatitis B infection, there was a lack of knowledge of Hepatitis B vaccination (Daboer et al., 2010).

“In the context of WTP analyses, the personal norm to pay for the good, the awareness of need with respect to providing the good, and the awareness of responsibility for paying are considered as behavioural determinants” (Liebe et al., 2011). Even though few studies have focussed on willingness to pay and awareness of the health perspective, one study conducted in Sweden revealed that awareness has positive acceptability on HPV vaccination (Dahlstrom et al., 2010). Therefore, it was surmised that if one had greater awareness on Hepatitis B and vaccination, one would be more willing to pay for HB vaccination.

Hypothesis 3: Greater level of awareness on Hepatitis B has a positive effect on willingness to pay for HB vaccination.

### **Perception**

Perception is described as an individual's belief in his or her own 'attributes' and the 'interpretation' of his/her own behaviour (Molden & Dweck, 2006). Belief has a relationship with socialisation and behaviour (Abraham & Sheeran, 2005). Individual belief is based on an individual's characteristics, which can be observed through his/her behaviour and primary socialisation. Lewin's 'seminal field theory

of 1935' is one of the earliest theories in health behaviour (Rimer, 2008). The theories of Kurt Lewin explain that an individual's behaviour depends on the individual and the environment (Sansone et al., 2003). The Health Belief Model (HBM), developed by Godfrey Hochbaum, is based on Kurt Lewin's theories, which explain that the perception of an individual is a very important determinant in individual reaction (Hochbaum et al., 1952). The study conducted by Hebert et al. (2005) showed that belief greatly influenced people to get vaccination. Luzar (1998) suggested that the attitude-behaviour relationship should be analysed to investigate an individual's willingness to pay.

Perceived susceptibility or risk of contracting disease is an important factor in influencing people to adopt healthier behaviour (Hochbaum et al., 1952). The similarity found in studies that have yielded this finding was that the targetted population perceived that they were not at risk. (Wai et al., 2005; Slonim et al., 2005; Rhodes & Hergenrather, 2002). In contrast, Vietnamese immigrants' susceptibility and their perceptions of severity caused them to believe that they were at high risk of premature death from liver cancer if they evaded Hepatitis B screening (Ma et al., 2007). For breast cancer, perceived susceptibility was seen to have a positive relationship to willingness to pay (Chaliki et al., 1995). Another study also indicated that perceived susceptibility for cancer has a direct and indirect relationship to willingness to pay (Bosompra et al., 2001). Another

study revealed that a positive and negative relationship exists between susceptibility and number of preventive dental visits (Chen & Land, 1986). Therefore, it was proposed that if one had greater perceived susceptibility to Hepatitis B, one would be more willing to pay for HB vaccination.

Hypothesis 4: Perceived susceptibility to Hepatitis B has a positive effect on willingness to pay for HB vaccination.

Perceived severity or perception of seriousness can be different among individuals even if they are from the same demographic group (Hochbaum et al., 1952). The rate of Hepatitis B vaccination increases in line with a health provider's advice given to patients educating them about the seriousness of a disease (Ma et al., 2006). Willingness to pay for genetic testing for cancer risk has a positive relationship to perceived severity (Bosompra et al., 2001). Therefore, it was hypothesised that if one had greater perceived severity of Hepatitis B, one would be more willing to pay for HB vaccination.

Hypothesis 5: Perceived severity of Hepatitis B has a positive effect on willingness to pay for HB vaccination.

Perceived benefit is an individual's perception or opinion of adopting new behaviour to reduce the chances of developing disease (Hochbaum et al., 1952).

In order to increase the number of women who undergo screening for breast cancer, women need to be aware of the benefits of breast cancer screening. The perception of current (Lucas et al., 2007) and future infectious diseases (Kim et al., 2008) was also found to influence households' willingness to pay for vaccination. In another study, benefits of and trust in vaccination were prominent factors in child influenza vaccination (Bhat-Schelbert et al., 2012). Bosompra et al. found that willingness to pay for genetic testing for cancer risk had a positive relationship with perceived benefits (2001). Therefore, it is believed that if one perceived Hepatitis B to bring more benefits, one would be more willing to pay for HB vaccination.

Hypothesis 6: Perceived benefits of HB vaccination has a positive effect on willingness to pay for HB vaccination.

Perceived barriers are the individual's perception of obstacles he/she may face in adopting new behaviour (Hochbaum et al., 1952). Perceived barriers are one of the main concerns in adult immunisation in the USA (Johnson et al., 2008). Understanding immunisation among adults was found to be low, apart from the lack of interest in promoting immunisation by health providers (Johnson et al., 2008). However, willingness to pay for genetic testing for cancer risk has a negative relationship with perceived barriers (Bosompra et al., 2001). Therefore, it is hypothesised that if one had more

perceived barriers to Hepatitis B, one would be less willing to pay for HB vaccination.

Hypothesis 7: A perceived barrier to Hepatitis B has a negative effect on willingness to pay for HB vaccination.

### **Risk Factors**

The willingness to pay for vaccination has been found to be related to two effects, which were the 'dead anyway effect' and the 'high payment effect' (Pratt & Zeckhauser, 1996). The 'dead anyway effect' refers to the belief that even with vaccination, the disease would ultimately cause death, and therefore, spending money on vaccination was a waste of resources. The 'high payment effect' refers to the rise in marginal utility of income experienced by people at high risk of contracting a disease. Most of the studies related to willingness to pay and risk factors revealed the 'high payment effect'. Public willingness to pay for genetic testing for cancer risk using a structural equation model showed a positive and direct effect on willingness to pay and cancer risk (Bosompra et al., 2001). Another study showed that high risk for diabetes led to individuals being willing to pay more for a diabetes risk reduction programme (Johnson et al., 2006). A different study conducted by Krupnick and his co-researcher on mortality risk reduction and willingness to pay by cancer patients showed that individuals with cancer and good mental health were more willing to pay compared to those without cancer (Krupnick et al., 2002). Therefore,

it is postulated that if one had more risk behaviour for Hepatitis B, one would be more willing to pay for HB vaccination.

Hypothesis 8: Risk behaviour for Hepatitis B has a positive effect on willingness to pay for HB vaccination.

**Model of the Study**

The model of this study was designed based on the study objectives and the Health Belief Model.

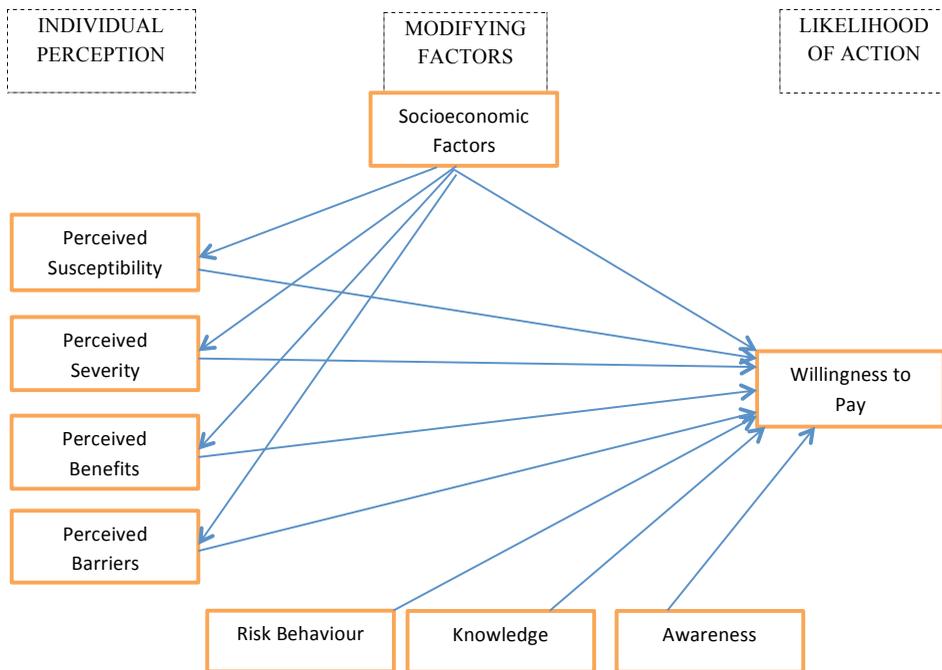


Figure 1. Conceptual model on the factors affecting willingness to pay for Hepatitis B vaccination

**RESEARCH QUESTIONS**

The research questions are based on the research model depicted in Figure 1. Questions to answer in this study included:

1. What is the level of knowledge and awareness of respondents of Hepatitis B vaccination and how does knowledge level and

awareness affect their willingness to pay?

2. What is the risk behaviour of people with Hepatitis B infection and how does the behaviour affect their willingness to pay?
3. What is the Malaysian perception of severity, perception of

sustainability, perception of benefit, and perception of barriers on Hepatitis B vaccination, and how does respondents' perception affect their willingness to pay?

4. What are the determinants of Hepatitis B vaccination among respondents and what are the perceived economic benefits?

### **SIGNIFICANCE OF STUDY**

Firstly, awareness and knowledge level of Hepatitis B and Hepatitis B vaccination focus on a selected population i.e. blood donors, healthcare workers and individuals living in an urban area. However, this study focussed on awareness and knowledge level of the general population, including the rural and urban population.

Secondly, it is important to be aware of risk behaviour among the general population as this is necessary to foresee its future and current impact on the health system. However, in a Malaysian perspective, none of the previous studies on willingness to pay focussing on risk behaviour of Hepatitis B considered this to be an important issue. Nevertheless, this issue was already studied in the Romanian perspective.

Thirdly, from a health perspective, consumer perception is very important to determine consumer behaviour towards vaccination. This is the first study conducted in Malaysia to assess the respondent's perception of Hepatitis B vaccination using the Health Belief Model.

Fourthly, currently, Hepatitis B vaccination is available at no charge to

Malaysian infants. Considering the nation's willingness to pay for HB vaccination, the government can allocate available healthcare resources (vaccine) at cost-controlled efficiency.

Fifthly, since the introduction of the EPI programme in 1989, adults who were born before 1989 experienced low Hepatitis B immunisation rates and are considered to be a high-risk group because they were not protected by this mandate. At the moment, there are no policies or compulsory vaccination enforced on this highly productive group who can contribute immensely to economic development. Therefore, this study intended to examine their willingness to pay for HB vaccination and to recommend the best policy development to reduce HB infection rates in Malaysia.

Lastly, at this moment, very few studies have been conducted to determine the willingness to pay for vaccination in Malaysia. Therefore, this research can be used as a reference by researchers or policy makers in the future to examine the willingness to pay for vaccination for other diseases.

### **CONCLUSION**

The study offered a theoretical model based on existing literature and developed the determinant for a HB vaccination model based on the empirical investigation of the positive and negative effects of different factors on willingness to pay for HB vaccination. Although risk factors associated with willingness to pay were investigated,

there is no research that has attempted to examine the effect of risk behaviour on willingness to pay related to vaccination.

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