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Attitudes towards Zika screening and vaccination acceptability among pregnant women in Malaysia

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ABSTRACT

The aim of this study was to examine the willingness of pregnant women to have prenatal screening for the Zika virus (ZIKV). Secondly, the study also assessed the acceptability of a hypothetical Zika vaccination and its association with the health belief model (HBM) constructs. A cross-sectional study was conducted from 4th October to 11th November 2016, among pregnant women who attended antenatal care at the University Malaya Medical Centre (UMMC), Kuala Lumpur, Malaysia. The majority (81.8%) was willing to be tested for ZIKV and 78% felt that their spouse would be willing to be tested for ZIKV. A total of 94% expressed a willingness to receive a Zika vaccination if available. The participants expressed high perceived benefits of a ZIKV vaccination. Although many have a high perception of the severity of ZIKV, the proportion with a strong perception of their susceptibility to ZIKV was low. In the multivariate analysis of all the HBM constructs, cue-to-action, namely physician recommendation (odds ratio [OR] = 2.288; 95% confidence interval [CI] 1.093–4.793) and recommendation from friends or relatives (OR = 4.030; 95% CI 1.694–9.587), were significantly associated with a willingness to be vaccinated against ZIKV. The favourable response to a Zika vaccination implies that more research attention has to be given to develop a vaccine against ZIKV. Should the vaccine be available in the future, publicity and healthcare providers would play a vital role in ensuring vaccine uptake among pregnant women.

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1. Introduction

Zika virus (ZIKV) infection was reported early in September 2016 in Malaysia, slightly over half a year since the World Health Organization declared the virus outbreak a Public Health Emergency of International Concern (PHEIC) in February 2016 [1]. ZIKV is spread by the same *Aedes* mosquito which spread the dengue fever. ZIKV adds to fears of a full-blown outbreak of the mosquito-borne virus in the tropical nation. Dengue is a major public health concern throughout tropical and subtropical regions of the world. Malaysia has come a long way in its battle with dengue fever. In Malaysia, dengue has constantly recorded an increased number of cases every year since 1980 [2]. The number of dengue fever cases reported in Malaysia continues to increase

year after year since 2011. With a population of almost 30 million, Malaysia recorded a total of 120,836 dengue cases in the year 2015, which included 336 fatalities [3]. Dengue has been declared as one of the national threats to the public in Malaysia [4]. Sharing the same vector as dengue fever, ZIKV leads to great deal of fear and anxiety among pregnant women in Malaysia. Although ZIKV often leads to a mild illness, the World Health Organization declared a public health emergency of international concern after finding a link between Zika and microcephaly. ZIKV causes fear in much of the Malaysian public as well as pregnant women, as Malaysia has a fertility rate of 2.0 births per woman aged 15–49. With a crude birth rate of 16.7 per 1000 population, Malaysia recorded as high as 521,136 live births in the year 2015 [5].

Screenings for infectious diseases such as hepatitis B, HIV, and syphilis are part of antenatal care. Likewise, in the event of a ZIKV outbreak, screening of pregnant women and their spouses plays an important role in preventing further ZIKV transmission. Pregnant women should be routinely assessed for possible ZIKV exposure during prenatal visits. Nonetheless, ZIKV screening is not

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mandatory in Malaysia. Symptoms of ZIKV can be very mild and pregnant women are not offered screening unless the fetus has evidence of severe brain abnormalities or they or their spouses have travelled to areas with active ZIKV transmission. Malaysia is a multi-ethnic country with the Malay Muslim as the vast majority of the country's Muslim population. To date, there is no empirical evidence related to religious convictions and a willingness to have prenatal screening among Muslim Malaysia. Several studies emphasized the importance of consideration of religious convictions in decision-making on some prenatal screening tests among pregnant Muslim women [6,7].

Although there is currently no routine ZIKV screening in prenatal care in Malaysia, exploring the role of culture and religious beliefs on the willingness of pregnant women in ZIKV screening may be beneficial in tailoring future screening programs. Therefore, the first objective of this study was to examine the willingness of pregnant women to accept prenatal screening for ZIKV.

Currently the vaccine for Dengue fever has been approved in 2016 and has been registered in many Dengue endemic countries like Philippines, Brazil, Indonesia, Thailand, Singapore and Malaysia. To date ZIKV vaccine is not available and if ZIKV vaccination is available, it may be effective in preventing ZIKV. Vaccine availability, however does not necessarily lead to vaccination acceptance. Various factors influencing willingness to accept vaccines, such as attitudes towards a vaccine's effectiveness and risk of diseases, have been widely published. Specifically, the influence of health beliefs using a health belief model (HBM) on the acceptability of various immunizations such as a hypothetical dengue vaccine, HPV vaccine, and influenza H1N1 vaccine, have been reported in both local and international studies [8–10]. With respect to the ZIKV pandemic, consistent with the HBM [11,12], we hypothesized that the perceived susceptibility to ZIKV infection, perceived severity of ZIKV, and perceived benefits of ZIKV immunization would predict greater ZIKV vaccine acceptability. Conversely, our hypothesis was that perceived barriers to immunization would be associated with lower levels of ZIKV vaccine acceptability. We also hypothesized that subjective norm, an external aspect of cues to action, namely advice from others such as family, friends or physicians, is also a determinant of acceptability of the ZIKV vaccine. Thus, the second objective of this study was to evaluate the acceptability of hypothetical ZIKV immunization and individuals' health beliefs about ZIKV and the vaccine against ZIKV using HBM concepts. Specifically, the association between HBM concepts and the acceptability of hypothetical ZIKV immunization was determined.

2. Materials and methods

2.1. Sample

A cross-sectional study was conducted from 4th October to 11th November 2016 among pregnant women who attended antenatal care at the University Malaya Medical Centre (UMMC), a government hospital in Kuala Lumpur, Malaysia. All pregnant women present at the antenatal outpatient clinic while waiting for their clinic appointments during the study period were approached to participate in the survey. Consenting women completed the anonymous interview survey assessing socio-demographic and pregnancy characteristics, knowledge about ZIKV, prevention of potential sexual transmission of ZIKV, prevention practices against mosquito bites, and lastly attitudes towards ZIKV screening and ZIKV vaccination. Data on knowledge about ZIKV and prevention practices were published elsewhere [13]. Only data related to attitudes towards ZIKV screening and ZIKV vaccination are reported here.

2.2. Instrument

The survey consisted of interviewing the participants about socio-demographic backgrounds and pregnancy characteristics. Questions about attitudes towards ZIKV screening asked about participants' willingness and perceived spousal willingness to take a screening test for ZIKV. Willingness to be vaccinated against ZIKV was assessed using statements that required Yes and No responses. The HBM concepts were operationalized with multiple questionnaire items. The participants' perceived susceptibility to ZIKV was measured by a one-item question on a four-point Likert-type scale anchored with *not at all susceptible*, *low susceptibility*, *moderate susceptibility* and *high susceptibility*. Perceived severity to ZIKV was measured by a two-item question, namely perceived severity on themselves and their unborn baby, similarly on a four-point Likert-type scale ranging from *not at all to high severity*. Two items were used to measure perceived barriers to immunization against ZIKV with responses on a four-point Likert-type scale. Responses to items on perceived barriers were given on a scale ranging from *not at all to high likelihood*. Perceived benefits of ZIKV vaccination were measured by using Likert-type items with four-point responses ranging from *not at all to highly beneficial*. Cues to action were measured by asking participants about their sources of advice (physician, spouse, friends or relatives) that were likely to serve as triggers to accept the ZIKV on a four-point Likert-type scale anchored with *definitely not*, *probably*, *very probably*, and *definitely yes*.

The questionnaires were in three languages: Bahasa Malaysia (the national language of Malaysia), English and Chinese. At enrollment, all participants were assured about the confidentiality of their responses and anonymity of their participation; written informed consent was obtained. The study was approved by the Medical Ethics Committee, University Malaya Medical Centre, Kuala Lumpur, Malaysia (MECID NO: 20162–2194).

2.3. Statistical analysis

Descriptive analysis was performed to determine the frequency distribution of demographic variables, perceived willingness to be screened for ZIKV and willingness to receive ZIKV vaccination. Multivariate logistic regression analyses were used to investigate factors associated with: (1) willingness to be screened for ZIKV, and (2) willingness to receive a vaccine against ZIKV. All significant variables ($P < 0.05$) in the univariate analysis were entered into multivariate logistic regression analysis using a simultaneous forced-entry model (enter method). Odds ratios (OR), 95% confidence intervals (95% CI) and P-values were calculated for each independent variable. The model fit was assessed using the Hosmer-Lemeshow goodness of fit [14].

3. Results

A total of 989 respondents completed the survey of total 1074 pregnant women approached to take part in the survey (response rate 92%). Based on the demographics collected (Table 1), the ethnicity composition of our participants was as follows: 686 Malay (69.4%); 178 Chinese (18.0%); 119 Indian (12.0%); and 9 natives of Sabah and Sarawak (0.6%). The majority of respondents reported having an average monthly income of MYR5000 to MYR1000 (one Malaysian Ringgit is equal to USD\$0.25). The majority of participants (52.6%) have been pregnant 2 or 3 times, including the current pregnancy, and most (57.8%) were in their third trimester of pregnancy. Over half (60.5%) expressed the intention to have another pregnancy.

The majority ($n = 809$, 81.8%) were willing to be tested for ZIKV. There were significant differences in willingness to be tested for

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