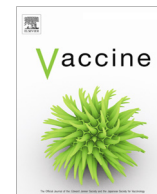




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Vaccine hesitancy among parents in a multi-ethnic country, Malaysia

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ABSTRACT

Background: Vaccine hesitancy is a threat in combating vaccine-preventable diseases. It has been studied extensively in the Western countries but not so among Asian countries.

Objectives: To assess the test-retest reliability of the Parent Attitudes about Childhood Vaccines (PACV) questionnaire in Malay language; to determine the prevalence of vaccine hesitancy among parents and its associations with parents' socio-demographic characteristics.

Methods: Forward and backward translation of PACV in Malay language was carried out. The reliability of the Malay-PACV questionnaire was tested among parents with children. The same questionnaire was used to study vaccine hesitancy among parents in a tertiary hospital in Kuala Lumpur. Information pertaining to socio-demographic characteristics, sources of information regarding vaccination and vaccine hesitancy were collected. Associations between vaccine hesitancy with socio-demographic factors were tested using Multivariable Logistic Regression.

Results: The Spearman correlation coefficient and Cronbach alpha for total PACV was 0.79 ($p < 0.001$) and 0.79 respectively. The intra-class correlation coefficients of the subscales ranged from 0.54 to 0.90 demonstrating fair to excellent reliability. A total of 63 (11.6%) parents were noted to be vaccine hesitant. In the univariate analyses, vaccine hesitancy was associated with unemployed parents, parents who were younger, had fewer children and non-Muslim. In the multivariate model, pregnant mothers expecting their first child were four times more likely to be vaccine hesitant compared to those who already had one or more children (aOR: 3.91, 95% CI: 1.74–8.79) and unemployed parents were also more likely to be vaccine hesitant (aOR: 1.97, 95% CI: 1.08–3.59). The internet (65.6%) was the main source of information on vaccination followed by brochures (56.9%).

Conclusion: The Malay-PACV questionnaire is reliable to be used. The prevalence of vaccine hesitancy among the multi-ethnic Malaysians was comparable with other populations. Pregnant mothers expecting their first child and unemployed parents were found to be more vaccine hesitant.

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1. Introduction

Vaccine hesitancy is defined as delay in acceptance or refusal of vaccines despite availability of vaccination services [1]. It also includes vaccine related beliefs and behaviors ranging from complete refusal of all vaccines to complete vaccine acceptance [2]. Globally, vaccine hesitancy is a threat in combating vaccine-preventable diseases [3–5]. Vaccine hesitancy has been studied extensively in the Western countries and their prevalence ranged from 8.9% to 28.2% [4,6–9]. However, there was a scarcity of such information from the Asian countries, including Malaysia.

For the past decades, Malaysia has achieved more than 95% immunization coverage among infants and young children [10]. However, the number of parents with children aged below two years refusing vaccination increased from 470 cases in 2013 to 1292 cases in 2014. These numbers could have been larger as data from the private health clinics were not included [11]. This issue became more distinct with the re-emergence of diphtheria in June 2016 [12]. In order to maintain high immunization coverage, parental understanding on the importance of vaccination and their willingness to vaccinate children is important [13]. Hence, there is an urgent need to study vaccine hesitancy among these parents.

To understand vaccine hesitancy, a valid and reliable tool is required. Many of the studies on vaccine hesitancy were conducted in qualitative design [14–17]. There were tools in quantitative design but most of them were not widely used [16]. One of the tools, Parent Attitudes About Childhood Vaccines (PACV) [18], developed in English by Opel et al. was validated and widely used

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in the United States [19]. The PACV contains 15 items with three domains, which are (1) behavior, (2) safety and efficacy, and (3) general attitudes. It has good internal consistency with Cronbach's alpha coefficients ranging from 0.74 to 0.84 [6] for the three domains. The PACV's validity was assessed by linking its scores with the children's immunization records. The results showed that parents who were more vaccine hesitant (with higher PACV score) had higher proportion of children being under-immunized [6,7].

Vaccine hesitancy has been reported extensively in the Western countries but not so among Asian countries including Malaysia. It is important to address the parents' concerns and intervene at an earlier stage to avoid further mushrooming of vaccine hesitant parents. Therefore, a study was initiated to (1) translate the PACV questionnaire into the Malay (national) language and to assess its reliability among parents, (2) determine the prevalence of vaccine hesitancy among parents and (3) to determine the associations between parents' socio-demographic background and vaccine hesitancy.

2. Material and methods

This study was divided into two phases. Phase I was a cross-sectional study to test the reliability of the Malay-PACV questionnaire and Phase II was also a cross-sectional study to understand vaccine hesitancy among parents.

2.1. Phase I: Translation and test-retest of the Malay-PACV questionnaire

PACV is a self-administered questionnaire that reads at a sixth-grade level equivalent to primary six in Malaysia. It was translated into the Malay language (national language of this multiethnic country) using the forward and backward method. Two experienced translators individually translated the PACV questionnaire into the Malay version. Both translations were then reviewed and reconciled to a single Malay version. Next, back translation into English was conducted by two other bilingual translators blinded to the original English version. The discrepancies that arose were discussed and refined to ensure that the Malay version reflected the meaning of the original PACV questionnaire. Before proceeding with the reliability test, the Malay-PACV questionnaire was pre-tested on ten employees at a tertiary institution in order to assess its understandability and clarity of questions. The Malay PACV questionnaire was finalized (Appendix A) after fine tuning with the opinions gained.

Considering the PACV was valid in its original language (English) [6,7], hence, we only carried out the reliability testing via test-retest method on the Malay-PACV questionnaire. The sample in the reliability test was recruited through convenience sampling among working adults from a public university and a primary school. Inclusion criteria for participants were: (a) parents aged 18 years and above, (b) parents currently having at least a child with age less than seven years old, or (c) mother who is currently expecting a child. The Malay-PACV questionnaire was administered twice to the participants in a one-week interval. One-week interval was selected as a period of 2–14 days apart is considered adequate for the interval to be long enough to reduce the effects of memory but short enough to diminish the likelihood of systematic alterations [20].

2.2. Phase II: Understand vaccine hesitancy among parents

2.2.1. Setting and sample

The study was conducted in the Paediatrics and Antenatal clinics of a tertiary hospital in Kuala Lumpur, the capital city of

Malaysia. The inclusion criteria were the same as listed in Phase I. We excluded parents from foreign countries as they might not be familiar with the vaccination schedule in Malaysia.

2.2.2. Ethical consideration

Approval was obtained from the Medical Research Ethics Committee (MREC) of University of Malaya Medical Centre, Kuala Lumpur, Malaysia (MRECID NO: 2016923-4278), the Department of Paediatrics and Department of Obstetrics and Gynaecology of the tertiary hospital. Participation in the study was voluntary. All data collected was kept confidential, and no unique identifiable information was collected. Participants did not receive any form of remuneration for participation in this study.

2.2.3. Data collection

The study was conducted from November to December 2016. Convenience sampling was carried out to recruit parents who visited the Paediatrics clinics and patients from the Antenatal clinics during the study period. All eligible parents/patients were invited to participate. After oral and written consents were obtained, participants completed the PACV questionnaire, which also included items regarding socio-demographic characteristics and sources of information on vaccination. They were asked to consider all childhood vaccines in general when they answered the questionnaire.

2.2.4. PACV questionnaire

The PACV questionnaire in bilingual (English and Malay) was used in the current study. The PACV contains 15 items in three domains (behavior, safety and efficacy, and general attitudes). Consistent with prior studies, items 1 and 2 were categorized under the behavior domain; items 7–10 were grouped under the safety and efficacy domain while items 3–6 and 11–15 in the general attitude domain (Appendix A) [7]. Responses were assigned to a score of 2 for hesitant responses, 1 for not sure responses and 0 for non-hesitant responses. Item scores were summed to a total score ranging from 0 to 30. For pregnant mothers who were currently expecting their first child, their maximum total score was 26 as they were unable to answer two behavior items, i.e. "Have you ever delayed having your child get a shot for reasons other than illness or allergy?" and "Have you ever decided not to have your child get a shot for reasons other than illness or allergy?". For parents with children who answered "don't know" in the above mentioned behavior items were considered as missing data because this was more likely to reflect poor recall rather than immunization hesitancy, as suggested by other studies [6,8]. The total raw score was converted to a 0–100 scale. The PACV scores were dichotomized into two categories, i.e. non-hesitant (score < 50) and hesitant (score \geq 50) following previous literature [6–8].

2.3. Statistical analysis

Data was entered and analyzed using the SPSS software, version 23.0. Internal consistency was assessed using the Cronbach's alpha. Test-retest reliability was assessed using the Spearman's correlation coefficients (r) and the intra-class correlation coefficients (ICC). Univariate analyses using X^2 test were performed to determine the associations between vaccine hesitancy with socio-demographic factors. The associations between vaccine hesitancy and socio-demographic factors were further investigated using the Multivariable Logistic Regression. All variables with $p < 0.25$ at univariate level were entered into the multivariate model. Odds ratio (OR) and 95% confidence intervals (CI) were reported. Significant level was preset at 0.05.

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