RELIABILITY AND VALIDITY OF HEALTH LITERACY QUESTIONNAIRE (NEW VIETNAMESE VERSION OF HLS-EU-Q47) AMONG MOTHERS OF CHILDREN UNDER 3-YEAR AT TWO VACCINATION CENTERS IN HANOI IN 2019

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The main objectives of this study are to validate the reliability of the new Vietnamese version of the health literacy survey, HLS-EU-Q47, among Vietnamese mothers of children under 3-years old. This was a cross-sectional study of 389 Vietnamese mothers. The data analysis was performed by factor analysis (Exploratory factor analysis - EFA and Confirm factor analysis - CFA). EFA results showed that only 3 questions in the health promotion survey had been removed from the original questionnaire. The CFA results (RMSEA between 0.03 and 0.08, CFI ≥ 0.9) had proved that the new Vietnamese version of the questionnaire had been validated as reliable with 44 questions, separated to 3 main fields: Health care service, disease prevention, and health promotion; there were 4 sub-parts (access, understanding, verification, application) in each field. In conclusion, this study had insulated the evident about the new Vietnamese version of the HLS-EU-Q47. We had changed the subject in each question to ensure the suitability of mothers participating in our research. The amendment of subject in each question has been made in accordance with the characteristics of our study objective.

Keywords: HLS-EU-Q47, mothers, under 3-year-old children, health literacy, validate measuring

I. INTRODUCTION

Health literacy is the ability to receive, read, understand and use health information to make appropriate medical decisions and follow treatment guidelines.[1] Health literacy is a very important skill because it affects personal health, navigating the health care system, and influences skills of sharing personal information, like health history, with providers, participating in self-management of chronic disease care, and helping people understand mathematical concepts such as probability and risk.[2] Given the fact that health literacy is now considered a global issue, the World Health Organization (WHO) has recognized that health literacy is an important determinant of health, while also recommending that countries around the world should establish an association of all people affected by health due to lack of knowledge of health literacy in order to monitor and coordinate strategic activities to enhance health literacy in different communities.[3]

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Health literacy is especially important to children under 3 years of age; this is the period when the child is in the "immune gap" with an immature immune system and is prone to malnutrition and other diseases that can cause long-term complications and even premature death.[4] Mothers are often the first to detect abnormalities in their children and provide valuable evidence for doctors to make early diagnosis and treatment for children.[5] Therefore, mothers need to have a comprehensive health literacy in order to detect diseases early, screen early, coordinate the treatment, as well as improve the health of children overall.

Health measurement is becoming increasingly important due to its impact on health status and health care outcomes.[6] As such there are now many different questionnaires used to measure health literacy, including the HLS-EU-Q47 questionnaire. The HLS-EU-Q47 questionnaire is a fairly comprehensive set of questions to measure the level of health literacy in a population. This questionnaire was developed from four areas of awareness (information access, information understanding, information verification, and information application) and three areas of health (health care, disease prevention, and health promotion) which form a 12-cell matrix to develop health literacy. These competencies are considered to be essential for processing health information in health care, disease prevention and health promotion.[7] The HLS-EU-Q47 questionnaire has been used in surveys with large research samples such as the European Health Knowledge Survey with more than 8000 participants in 2015, assessing health literacy in six countries in Asia (Indonesia, Kazakhstan, Malaysia, Myanmar, Taiwan, and Vietnam) with a sample size about 10, 210 anonymous research participants from 2012 to 2014. The result of validity in that study was that the RMSEA index was less than 0.10, and CFI were 0.90 for most regions in different countries, which is enough to fit the model data well.[8] The HLS-EU-Q47 can be seen as a questionnaire with a high-reliability coefficient and suitable for large-scale applications.[8]

In Vietnam, the HLS-EU-Q47 questionnaire has been applied in the main cities of Northern Vietnam; it was used in Hai Duong and Hai Phong in 2014 on people aged 15 years and older. The questionnaire has a large reliability coefficient of 0.908. However, this HLS-EU-Q47 questionnaire has only focused on assessing health literacy related to individuals; there are no tools to assess the health literacy of children's caregivers.

Based on the HLS - EU - Q47 health assessment toolkit, we developed and tested this toolkit on mothers to assess the health capacity of mothers with children under 3 years of age. This study has the following 2 aims:

(1) Validate the health literacy survey questionnaire (new Vietnamese version of HLS-EU-Q47) among mothers with children under 3 years old at the Immunization Clinic of Hanoi Medical University.

(2) Test reliability of the health literacy survey questionnaire (new Vietnamese version of HLS-EU-Q47) among mothers with children under 3 years old at the Immunization Clinic of Hanoi Medical University.

II. METHODS

1. Participants

All participants were mothers with children from 0 to less than 36 months of age who took their children to the immunization clinic at Hanoi Medical University (2 facilities) in Hanoi, Vietnam. In total, 389 participants were selected by convenience sampling.

2. Study design

The cross-sectional study was conducted on all mothers with children under 3 years of age taking their children to receive services at 2 immunization facilities of Hanoi Medical University from June 2019 to August 2019. The information was collected by direct interviews regarding the mother's demographic and sociological characteristics, the children's demographic characteristics, and information on finding, reading, understanding, testing, and using health information of mothers in the field of health care, prevention and health promotion.

Questionnaire development: Health literacy was assessed with the European Health Literacy Questionnaire, HLS-EU-Q47, which consists of three groups of questions (health care, disease prevention, and health promotion). These groups included 11 – 22 questions relating to the availability, understanding, evaluation, and implementation of information relating to health. Our respondents were required, in accordance with the scientific and research activity of the hospital, to provide complete answers to all questions. Answers were given on a scale featuring four levels: 1, very difficult; 2, difficult; 3, easy; and 4, very easy. There were no answers in this category.[9]

The questionnaire was adapted to assess the health literacy related to health problems for children of mothers under 3 years old, based on the Vietnamese version of the validated HLS-EU-Q47 .

Content of questions was modified from evaluating an individual's health literacy to health issues for their children. Additionally, some specific questions about diseases and risk factors relating to the respondent were changed to relate to their children under 3 years of age.

Pilot Study: The trial was conducted on 50 mothers with children under 3 years of age, in order to determine any mismatch in the expression and content of the questions. After that, comments of all 50 participants were collected and reviewed; most of the comments related to confusion about the academic or medical terms used in the survey. The survey was modified with more appropriate vocabulary for the mothers.

3. Data analysis

Construct validity: Factor analysis was used to determine the validity of the question structure. Before factor analysis, the Kaiser-Meyer-Olkin (KMO) analysis was used to determine the completeness of the sample and Bartlett's global test was used to determine the test size. In order for the sample size to be suitable for factor analysis, the KMO had to be higher than 0.5 and Bartlett's global test results had to be statistically significant.[10] The main component analysis with varimax rotation was used to make the factor model more invariant. Then exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was applied to support findings related to the sub-aspects of the questionnaire. The lower limits of the data fitness index of the model was determined as follows: RMSEA index between 0.03 and 0.08; CFI error correction index ≥ 0.9.[11]

Reliability of the questionnaire: Cronbach's internal uniformity coefficient alpha was used to check the reliability of the Likert type scale. For a measurement tool to be considered reliable, its reliability coefficient must be as close to 1 as possible. A measurement tool is considered unreliable if the Cronbach micro alpha coefficient is below 0.3, poor reliability if within the range of 0.3 to 0.5, and high reliability if within the range of. 0.5 to 0.8 and very reliable if it is between 0.8 and 1.09. The total item correlation coefficients were calculated to check the relationship between scores from the

HLS-EY-Q47 test items and the total test score. A coefficient greater than 0.2 is considered acceptable when selecting items.[9]

4. Ethics

The study was approved by the scientific committee of the Institute for Preventive Medicine and Public Health. Potential participants were provided time to review the participant information sheet and had the opportunity to ask further questions. Those who chose to participate then completed the survey. Those who chose not to participate were able to leave the session.

III. RESULTS

1. Social and demographic characteristics of participants

Table 1. Social and demographic characteristics of participants (n = 389)

Demographic Characteristics		n	%
Age group	< 30	227	58.4
	>= 30	162	41.6
Ethnicity	Kinh	378	97.2
	Other	11	2.8
Religions	Yes	14	3.6
	No	375	96.4
Education level	Under high school	11	2.8
	High school	51	13.1
	University and Postgraduate	327	84.1
Employment	Worker / Farmer	19	4.9
	Housewife	51	13.1
	Businessman	49	12.6
	Officer	182	46.8
	Health staff	39	10.0
	Other	19	4.9
Social life			
Position	Leader	30	7.7
	Staff	359	92.3
Marital status	Married	386	99.2
	Single/Divorced	3	0.8
Household	Urban	321	82.5
	Rural	68	17.5

Clubs, groups, social networks for parents	Yes	197	50.6
	No	192	49.4
Using internet for children's health information	Usually	156	40.1
	Not usually	233	59.9
Total		389	100

227 participants were under the age of 30 (58.4%). In general, the majority of participants were Kinh; there were 375 participants who reported not following any religion. Regarding education, 84.1% of mothers graduated from university or attended higher education. As per the provided information, only 7.7% of participants were leaders in their careers. Most of the interviewees were married (99.2%). Regarding household questions, 82.5% of the number of women reported that they were living in urban area. There were no significant differences between the quantity of mothers who joined parenting clubs and who did not. Base on this survey, 59.9% of mothers confirmed that they used the internet for children's health information occasionally.

2. Validity

Testing Assumptions of Factor Analysis with 3 domains of Health literacy (Health care, Disease prevention, Health promotion), Kaiser-Meyer-Olkin index (HC-HL = 0.87, DP-HL = 0.89, HP-HL = 0.88) and the Bartlett's test (HC-HL = 2227.473, DP-HL = 2229.643, HP-HL = 2198.402 with $p<0.05$) showed the adequacy of the sample for the application of factor analysis.

Results of the EFA showed that only 3 question in Health promotion had been removed from the original questionnaire (which were: e1, e15,16). The new Vietnamese version of HLS-EU-Q47 consisted of 4 factors that have correlativeness with health literacy tasks: access, understand, appraise, and apply to all 3 domains of health literacy.

Table 2. Construct Validity of new Vietnamese version of HLS-EU-Q47 with goodness-of-fit indices

Model	Questions	Absolute model fit	Incremental fit
		RMSEA	CFI
Health care service	16	0.075	0.901
Prevention	15	0.078	0.908
Promotion health	13	0.075	0.919

The results showed a relatively good fit of all the four-factor structure within the three domains of mother health literacy with all RMSEA indices between 0.03 and 0.08 and all CFI ≥ 0.9.

3. Reliability

The value of Cronbach's coefficient in our study showed good validity and provided the following results: total index of health literacy $\alpha = 0.942$, health care domain $\alpha = 0.851$, disease prevention $\alpha = 0.883$, and health promotion $\alpha = 0.871$. This item provides the researchers with a general idea of participants' health literacy ability.

Health care service - Health literacy

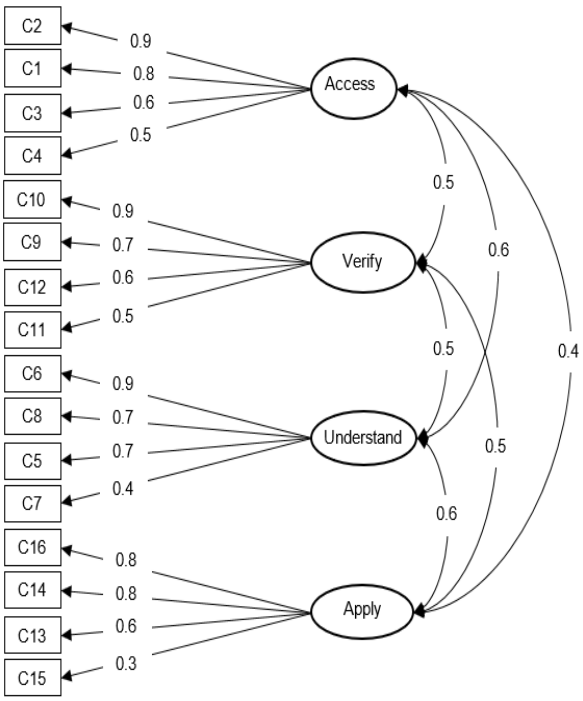

Figure 1. Confirmatory Factor Analysis of the Health care service – Health literacy Index for mothers of children under 3-year

Disease prevention – Health literacy

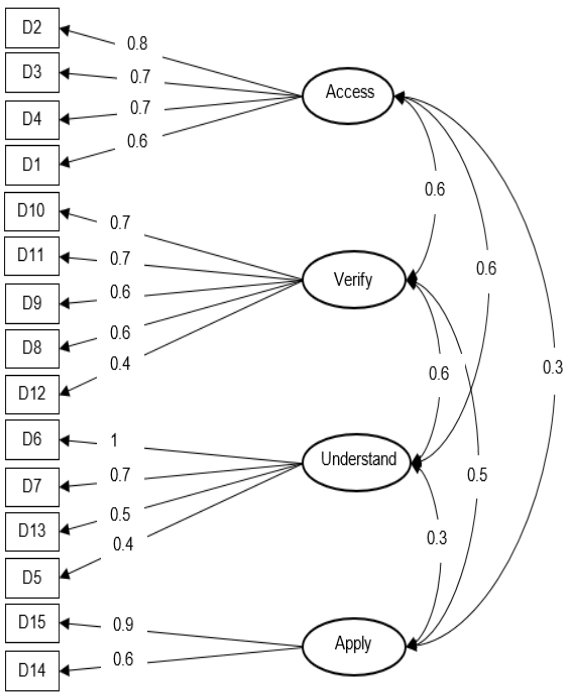

Figure 2. Confirmatory Factor Analysis of the Disease prevention – Health literacy Index for mothers of children under 3-year

Health promotion – Health literacy

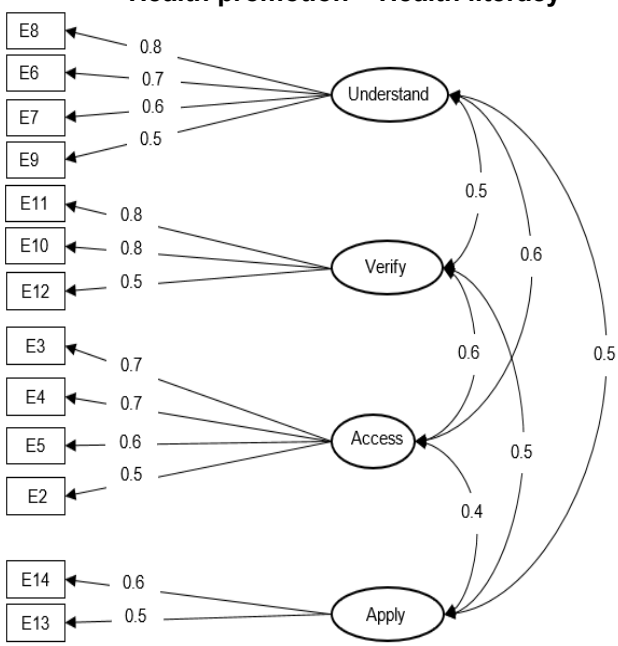

Figure 3. Confirmatory Factor Analysis of the Health promotion – Health literacy Index for mothers of children under 3-year.

IV. DISCUSSION

The new Vietnamese version of HLS-EU-Q47 was developed and tested to provide a comprehensive health literacy scale for mothers whose children are from 0 to 3 years old at 2 vaccination centers in Hanoi.

The results showed that new Vietnamese version of HLS-EU-Q47 consists of 3 models corresponding to 3 domains: health care, prevention, and health promotion, and includes 4 factors: accessing, understanding, verifying and applying the information which similar to research, development, and test of initial HLS-EU-Q47 in European countries and 6 Asian countries.[8,12]

The SEM of the 3 models shows the close relationship between 4 skills: accessing, understanding, verifying and applying. These 4 skills are clearly separated from each other. This suggests that the majority of mothers with high education can clearly distinguish the difference between the above skills. This is different from the study, "Analysis of Validity and Reliability study of the Health Literacy Index on Female Marriage Immigrants," which measured on the HLI-FMI scale for results into 2 types according to patterns of tasks. The first factor encompassed access and comprehension tasks (Access – Understanding Health Literacy), and the second factor encompassed appraisal and application tasks (Appraise – Apply Health Literacy). The researchers hypothesized that "4 tasks for health literacy coalesced into 2 factors that were not clearly separate from each other, because health literacy is a multidimensional and complex concept". This difference may be due to our different research subjects, with Female Marriage Immigrants participating in above research, with Korean proficiency at "Read short sentences essential for living" and "Read simple words" (58.9%).[13]

The limitation of our study was that it is difficult to select the mothers who have children under 3-year randomly, thus we used convenience sampling. It may cause the result not adequate representativeness for entire population.

V. CONCLUSION

This study was the first to assess comprehensive health literacy in this population. Based on the results, the HLS-EU-Q47, which can be used as a comprehensive health literacy survey tool, was found to be a reliable, valid tool in Hanoi. We suggest using the same tool to assess health literacy among mothers of children under 3-year in different locations and provide a practical comparison in the future.

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