Assessment of Health Literacy among People in a Rural Area in Malaysia Using Newest Vital Signs Assessment

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Authors' contributions

This work was carried out in collaboration between all authors. Authors JN and MNA designed the study, wrote the protocol and supervised the work. Authors SMS, BMF and BF carried out all field work and performed the statistical analysis. Author MNA managed the analyses of the study. Authors JN, AMN and BMF wrote the first draft of the manuscript. Authors AN, BF and HIZ managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Introduction: Health literacy is defined as the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the whole duration of the person's life. Effective health literacy begins in early childhood and continually builds on knowledge and experience gained throughout the life span.
Aims: To determine the use of Newest Vital Sign (NVS) in the Malay language as a tool to measure level of health literacy among adults in the rural population of Malaysia.
Study Design: Cross sectional study.

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Place and Duration of Study: Federal Land Development Authority Settlement Scheme (FELDA) in the state of Pahang, Malaysia, from January 2011 to December 2012.
Methodology: NVS in the Malay language was administered to 300 respondents who were 18 years of age and above, able to converse in Malay, literate, have a visual acuity sufficient to read the instruments being tested, have normal cognitive function, enough to interact with the study personnel and able to do simple calculations, were included in this study.
Results: The study revealed that, of the 111 respondents, 34 completed the questionnaire within three minutes. Seven (20.6%) adults were of adequate literacy having the ability to answer a minimum of four questions correctly within three minutes given. Meanwhile, 17 (50.0%) adults were of limited possible literacy and 10 (29.4%) were of the limited likely group.
Conclusion: The Malay version of NVS was inappropriate and inadequate to measure the health literacy among adults in the rural population. This study showed that 50% of adults in the rural population has a limited possible level of health literacy.

Keywords: Health literacy; numeracy; food package nutrition label; NVS-Malay.

1. INTRODUCTION

Health literacy (HL) is defined as cognitive and social skills, which determine the motivation and the ability of individuals to obtain access, to understand and use information in ways, which promote and maintain good health [1]. It has since become an important topic for both researchers and policy makers. Health literacy can also be defined as the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course [2]. These definitions have emphasized that accessibility of health information by the public is more important compared to its availability through services. The level of health literacy is related to education, culture and language, communication skills of professionals, the nature of materials and messages and the settings in which health-related supports are provided. Health literacy encompasses a broad context in daily living where people live, learn, work, worship and play. It recognizes that health status and learning are closely linked at all ages and stages of life [3].

1.1 Effective Health Literacy

The process of health literacy begins in early childhood and continues to build on knowledge and experience gained throughout the life span [1]. Health literacy usually emphasizes on the skills of individuals and explains the degree to which individuals have the capacity to obtain process and understand basic health information and services needed to make appropriate health decisions [4]. Hence, the effectiveness depends on knowledge gained through reading, listening, gathering and disseminating information and decision-making and the ability to apply these skills to health situations [5]. Patients who are able to read, understand and act on the health care information are considered health literate [6]. However, some expanded definitions of health literacy have included a working knowledge of disease processes, reliability and understanding of the labels and ability to comprehend the disease outcome [7].

1.2 Measurement of Health Literacy

Individuals with adequate health literacy are able to understand the information, and make decisions about health and ultimately reduce inequities in health [8]. To date, with the increase in awareness towards the importance of health literacy in health and health care, various types of health literacy assessment tools have been developed based on the study undertaken in the United States of America (USA), Canada, Australia and Europe. These tools are used to measure literacy in the health care setting focusing on the ability to read and do simple calculations [1,4,9].

The two most commonly used assessment tools in health literacy study are the Test of Functional Health Literacy in Adults (TOFHLA) and the Rapid Estimate of Adult Literacy in Medicine (REALM). TOFHLA is a bilingual assessment tool (English and Spanish) that uses real health materials to evaluate reading comprehension and numeracy skills. The test contains 50 questions and takes about 20 minutes to complete. A short version (S-TOFHLA) contains 37 questions that takes around seven minutes to complete. REALM evaluates word recognition and pronunciation level measured from one to four categories. REALM takes about five minutes to finish. The tests are usually administered in a research setting, although they can be used in the primary practice setting.

Although there are many assessment tools that measure the level of health literacy of individuals and relationship between health literacy with various health outcomes, the framework for health literacy as a determinant of health outcomes can be debated [10]. Hence, this study is conducted to determine the use of the Newest Vital Sign (NVS) in the Malay language as a tool to measure the level of health literacy among adults in the rural population in Malaysia.

2. MATERIALS AND METHODS

2.1 Study Area

This study was conducted at the Federal Land Development Authority (FELDA) Schemes in the Pahang State namely; Lurah Bilut, Jengka 19, Bukit Kuantan and Chini 3. FELDA is a Malaysian government agency responsible for the resettlement of the rural poor into a newly developed land areas, which organize various smallholder farmers to grow cash crops.

2.2 Study Design / Population

A cross sectional study was conducted from January 2011 to December 2012 among FELDA settlers. A total of 315 respondents from 18 years of age and above, ability to converse in Malay, literate, have a visual acuity sufficient to read the instruments being tested, have a normal cognitive function adequate to interact with the study personnel and able to do simple calculations were eligible for this study. Of these, 300 agreed to participate giving rise to 95.2% response rate. However, only 111 respondents

were retained in the analysis due to dropouts. Written informed consent were obtained at the beginning of this study. This study was approved by the Malaysian Medical Research and Ethics Committee (MREC) and supported by National Institutes of Health, Malaysian Ministry of Health grant (NMRR NUMBER:10-745-7010).

2.3 Data Collection and Research Tool

The Newest Vital Sign (NVS) is a bilingual (English and Spanish) rapid literacy assessment tool that identifies patients at risk for low health literacy. The tool can be administered in a clinical setting within three minutes. This tool is based on a nutrition label from an ice cream container. Patients will be given the label and answer six predetermined questions regarding the content from the food label. The answer will be categorized into a score of 0 to 6 and divided into three levels namely, 1) limited likely, 2) limited possible and 3) adequate. Results from the test will be used to improve the communication practices to achieve better health outcomes [7].

A modified Malay version of the NVS instrument was used in this study. This version was translated using forward and backward translation technique with slight modification on the amount of saturated fat from 9 g to 10 g [11-13] on the nutrition label to suit the Malaysian population as shown in Tables 1 and 2. Respondents must have adequate reading skill, comprehension and ability to perform calculations [14] such as calculating the amount of saturated fat consumed each day.

Table 1. NVS-Malay modification show card: Product description – Ice cream brand 'Love'

Nutrition facts		
Serving size	½ cup	
Servings per container	4	
Composition	**Amount per serving**	
Calories	250 kcal	
Fat calories	120 kcal	
Average composition	**Amount per serving (½ cup)**	**% Recommended Nutrient Intake (RNI)**
Total fat	13 g	20%
• Saturated fat	10 g	40%
Cholesterol	28 mg	12%
Sodium	55 mg	2%
Carbohydrate	30 g	12%
• Fiber	2 g	
• Sugars	23 g	
Protein	4 g	8%
Ingredients: Skim milk, sugar, milk fat, egg yolks, peanut oil. Consists vanilla extract.		

Table 2. Modified NVS-Malay questions and correct response

Original version: Question and correct response	NVS-Malay: Modification question and correct response
Question 2: If you are allowed to eat 60g of carbohydrates as a snack, how much ice cream could you have?	**Question 2:** If you are allowed to eat only 60g of carbohydrates, how much ice cream could you have?
Question 3: Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 grams of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day? ***Answer:*** *33 is the only correct answer*	**Question 3:** Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 grams of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day? ***Answer:*** *32 is the only correct answer*
Pretend that you are allergic to the following substances: Penicillin, peanuts, latex gloves, and bee stings.	Pretend that you are allergic to the following substances: Latex gloves, peanuts, and bee stings.

The tool contains information about nutrition label on a pack of ice cream. Respondents were given show card on ice cream nutrition label container to read and subsequently, verbal interviews were conducted regarding the information. No time frame was allocated to finish the task in order to determine the level of health literacy among the respondents. The score sheet contains six domains about calorie intake, amount of serving(s), saturated fat intake, percentage of daily value of calorie intake, safeness? of eating the ice cream and ingredients of the ice cream.

3. RESULTS

The respondents were predominantly Malays, aged between 26 and 35 years. The majority were males (55%). About 31% were self-employed and 21% were housewives. Nearly 60% had a secondary education.

3.1 Limited Literacy Likely, Limited Literacy Possible and Adequate Literacy

The results on three readings for NVS-Malay in Table 3 showed that only seven (20.6%) adults were of adequate literacy – being able to answer minimum of four questions correctly within three minutes given.

3.2 General Behaviour during Field Observation

Interviewers were instructed to read the questions as worded using standardized interviewing techniques in order to achieve comparable data across respondents [15-16]. During this process, silent behaviour was observed. As the interview progressed, respondents started to shake their heads in response to the questions on the show card. They frowned and touched their forehead, and some cried out aloud by saying "ah…numbers!", "calculation!", "mathematics!", "I don't like Math!" A few numbers of respondents refused to complete the test by giving excuses like "I do not know the answer" or "I do not want to answer". Various modes of facial and verbal expression were shown to indicate that they wanted to withdraw from the sessions. This behaviour showed the uneasiness of respondents towards the process.

Table 3. Respondent level of health literacy

NVS-Malay classification (score range within 3 minutes)	No. of respondent	Percentage (%)
Limited likely (0-1)	10	29.4
Limited possible (2-3)	17	50.0
Adequate (4-6)	7	20.6

Note: n=111; a total of 77 respondents completed the test beyond three minutes

4. DISCUSSION

Level of health literacy is an indicator to measure a person's ability to seek, understand, and use health information. Various tools have been designed to measure health literacy across individuals, communities and populations [17]. Exploration into many domains such as nutrition labels, drug prescriptions, food and ingredients intake, diet and life style, physical activities and mental health should be incorporated to determine the best measurement tools to assess the level of health literacy [18]. Definition of health literacy may be different due to the different sets of domains used in the measurement tools. Hence, there are no gold standards of measurement to assess the level of health literacy [19-20].

This study adapted the Newest Vital Sign [7] to assess HL levels among the Malaysian population. A few studies done in Malaysia showed the lack of comprehension of nutrition labels [21-23]. This might be due to the inability to interpret and understand the serving size, the percent daily value, the energy requirement and the recommended intake of major nutrients [23,24-25].

Few respondents refused to take the NVS (4.8%), which indicated that this tool was acceptable among them [26-27]. The NVS was administered, on average, beyond 3 minutes, which demonstrated the utility of the NVS in the rural population was inadequate [28].

The result showed that high 'limited likely' and 'limited possible' literacy were due to the respondents' need to read and to comprehend the nutrition label, as well as resolving a numeracy skills. According to Cheryl et al. [14], in order for respondents to answer questions correctly in this tool, they must have adequate reading skills; comprehension and the ability to perform calculations (e.g. calculate the number of calories per serving). Adults needed to derive their cognitive abilities since NVS required math skills for success [28].

4.1 Limitations

This study was limited to a single centre only, which may have limited the generalizability of the study findings. Secondly, the sample was recruited among rural population who generally have low academic qualification. The respondents also may not be familiar with the health tools and related materials. A small percentage of respondents may have been missed which led to the possibility of selection bias. No statistical analysis was carried out to identify the associations between age, gender and education with the level of health literacy.

4.2 Time Frame Measure

The NVS-Malay showed that only one respondent managed to answer six questions correctly within time frame (three minutes). However when NVS-Malay was tested within a seven minutes time frame, a total of 29 (26.1%) respondents managed to score a minimum of 4 marks, 38 (34.2%) respondents scored a minimum of 2 marks and 27 (24.3%) respondents scored a minimum of 1 mark, while only 10 (9.0%) respondents did not score any marks. A positive response rate was directly proportionate to the increased time frame. A suitable time frame for Malaysians to answer NVS-Malay correctly (4 to 6 marks) was found to be five minutes.

5. CONCLUSION

The Malay version of NVS was inappropriate and inadequate to measure the health literacy among adults in the rural population. This study showed that 50% of adults in the rural population has limited possible level of health literacy. However this tool should be tested among urban as well as rural population throughout Malaysia to determine the appropriateness of the tool.

CONSENT

All authors declare that written informed consent was obtained from the respondents.

ETHICAL APPROVAL

All authors hereby declare that this study have been examined and approved by the Malaysia Medical Research and Ethics Committee (MREC) and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared no competing interests.

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