

ORIGINAL ARTICLE

The Malay Version of Dialysis Specific Nutrition Literacy Scale (DSNLS): Translation and Face Validation.

Sarah Muneera Karami¹, Wan Azdie Mohd Abu Bakar^{1,2}, Roselawati Mat Ya³, Norhasmah Sulaiman⁴, Nor Azwani Mohd Shukri^{1,2*}

¹*Department of Nutrition Sciences, Kulliyah of Allied Health Sciences, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia.*

²*Food Security and Public Health Nutrition Research Group (FOSTER), Kulliyah of Allied Health Sciences, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia.*

³*Department of Community Medicine, Kulliyah of Medicine, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia.*

⁴*Department of Nutrition, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.*

Corresponding Author

Nor Azwani Mohd Shukri

Department of Nutrition Sciences, Kulliyah of Allied Health Sciences,
International Islamic University Malaysia, Kuantan, Pahang, Malaysia.

Email: norazwani@iium.edu.my

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Abstract

Background: Nutrition literacy is essential for understanding, assessing, and utilising nutritional information, particularly in end-stage renal disease (ESRD) patients, to improve their overall well-being. A suitable tool is necessary to assess their level of nutrition literacy. Unfortunately, there is a lack of a specific nutrition literacy scale in the Malay language for the hemodialysis patients' population. Therefore, the aim of this study is to translate and validate the Dialysis-Specific Nutrition Literacy Scale (DSNLS) into Malay. **Methods:** The questionnaire was forward and backward translated by experts in dietetics and linguistics following established guidelines, resulting in a pre-harmonised Malay translation and two backward English translations. An expert committee reviewed and harmonised these translated questions. The questionnaire was then evaluated through a cognitive interview and face validity assessment among 15 hemodialysis patients. **Results:** During the expert committee assessment, several phrases underwent revisions to improve clarity and comprehension. Respondents preferred that certain terms be replaced during pre-testing with common phrases used in nutrition education. All questions achieved a face validity index value greater than the acceptable value, indicating good validity (≥ 0.87). **Conclusion:** The Malay version of the DSNLS underwent translation and face validation, and the findings demonstrate that it is clear and comprehensible for evaluating nutrition literacy among local hemodialysis patients.

Keywords: *Dialysis, DSNLS, End-stage renal disease, Malay, Nutrition literacy, Translation.*

Introduction

The World Health Organization (WHO) stated that health literacy is the literacy that entails people's knowledge, motivation, and competences to access, understand, appraise, and apply health information in order to make judgements and take decisions in everyday life concerning health care, disease prevention, and health promotion to maintain or improve quality of life during the life course [1]. Poor health literacy can contribute to poor health consequences [1,2], particularly impacting minority communities, elderly individuals, and individuals with lower levels of education and/or income [2]. Meanwhile, nutrition literacy refers to 'the degree to which individuals have the capacity to obtain, process, and understand nutrition information and skills needed in order to make appropriate nutrition decisions' [3]. The process involves acquiring knowledge of nutritional principles and possessing the ability to perceive, assess, and utilize nutritional information, specifically to be cognizant of the various nutrients and their influence on overall well-being.

In Malaysia, the incidence of patients with end-stage renal disease (ESRD) necessitating renal replacement therapies, such as hemodialysis, has exhibited a consistent upward trajectory over the course of the last two decades. According to the 30th Report of the Malaysian Dialysis and Transplant Registry, there were a total of 9,123 new dialysis patients, consisting of 7,477 new patients receiving hemodialysis and 1,646 new patients receiving peritoneal dialysis in 2021 [4]. Kidney dysfunction among ESRD patients who are undergoing dialysis treatment requires specific dietary guidelines to prevent possible health outcomes such as fluid overload, electrolyte imbalance, and protein-energy depletion.

Dietary adherence among hemodialysis patients has been found to be reasonably predicted by nutrition literacy [5]. A previous cross-sectional study conducted in Malaysia involving 218

hemodialysis patients revealed that almost half (46.3%) of the patients exhibited a limited level of nutrition literacy based on the Dialysis Specific Nutrition Literacy Scale (DSNLS) [5]. It was found that low nutrition literacy is common among patients who are older, have a lower education level, have shorter dialysis vintage, and have never received nutritional counselling from healthcare professionals [5]. Moreover, lower health literacy among hemodialysis patients has been associated with non-adherence to dialysis treatment, frequent hospitalizations, and increased visits to the emergency department [6]. Therefore, adequate nutrition literacy is crucial to enable them to comprehend, evaluate, and apply diet-related knowledge in their everyday lives. This is essential to improving patients' nutritional management and enhancing their overall well-being.

Instruments for health literacy assessment designed specifically for dialysis patients are scarce; therefore, previous research has employed general health literacy assessment tools for use among this population. These include the European Health Literacy Survey (HLS-EU-Q) [7], the Health Literacy for Iranian Adults (HELIA) [8], and the Health Literacy Questionnaire (HLQ) [9], which measure functional, interactive, and critical domains of health literacy. More recently, researchers in Taiwan have developed and validated a dialysis-specific health literacy questionnaire among their HD population, which also assesses the three domains [10]. However, there were no scales for nutrition literacy assessment among the dialysis populations, hence the development of the DSNLS [5]. The other nutrition literacy questionnaire for this population was the Nutrition Literacy Evaluation Scale [11] which focused on four dimensions: 'nutrition knowledge level', 'cognitive attitude', 'behavioural practice', and 'information acquisition ability'. Nevertheless, this scale has only been used in China.

Therefore, this study intends to translate and validate the English DSNLS into Malay, as it is the only nutrition literacy questionnaire intended for dialysis patients that has been previously used locally [5]. Researchers and healthcare providers in Malaysia would benefit from the validated Malay version of the DSNLS, through which they may evaluate the nutrition literacy level of the ESRD patients and provide interventions as necessary. This, in turn, could lead to improved nutritional management and an enhanced ability to manage their condition, prevent complications, and maintain overall health among the dialysis patients.

Materials and methods

Dialysis Specific Nutrition Literacy Scale (DSNLS)

Based on the HLS-EU-Q [12] that has been validated and utilized in six Asian countries, including Malaysia, the DSNLS was constructed to assess a patient's perceived ability in obtaining (interactive literacy), understanding (functional literacy), appraising, and applying (critical literacy) dietary knowledge pertaining to dialysis [5]. The tool comprises eight items that are graded on a scale of 1 (poor ability) to 3 (good ability). The nutrition literacy mean score is converted into continuous indices using the formula: Index = (Mean - 1) x (100/2), which spans from 0 to 100. A higher index indicates a higher level of nutrition literacy where a limited nutrition literacy level has a mean index score of 50 or less, while an acceptable level has more than 50. The DSNLS demonstrated a good content validity (S-CVI/Ave = 0.96) as evaluated by six renal healthcare specialists [5]. Additionally, the entire DSNLS index correlated well with the HLS-EU-Q16 (intra-class coefficients, ICC = 0.792), while the internal consistency (Cronbach's alpha = 0.916) also showed good reliability.

Study Design

This study employed translational research to translate and validate an English questionnaire

into Malay using the WHO instrument translation guideline [13]. This is to bridge the gap between theoretical knowledge and practical application to ensure that this questionnaire is culturally and linguistically appropriate to be used among the Malay-speaking population.

Phase 1: Questionnaire Translation

The DSNLS underwent five steps of the translation process: i) forward translation of the questionnaire from English to Malay; ii) synthesis of the pre-harmonized Malay version of the questionnaire; iii) backward translation of the pre-harmonised Malay version of the questionnaire back into English; iv) expert committee review of the translated versions of the questionnaire to develop a harmonised version; and v) pre-testing of the questionnaire (using cognitive interview) among 15 patients who were undergoing hemodialysis procedure at the Pusat Dialisis Majlis Ugama Islam dan Adat Resam Melayu Pahang (MUIP). Each process is described in detail elsewhere [14].

Phase 2: Questionnaire Validation

Face validity was conducted concurrently with the cognitive interview among the 15 hemodialysis patients [13,15]. The comprehensibility and clarity of each item were evaluated with a four-point Likert scale that encompassed responses ranging from 'Item is not clear and understandable' to 'Item is very clear and understandable'. Items that obtained a face validation index (FVI) value of 0.80 or higher were maintained [15]. Item FVI (I-FVI, percentage of raters who give an item or question a 3 or 4 for clarity and understanding) and scale FVI (S-FVI, mean of the I-FVI scores for all items or the average of all raters' clarity and comprehension) were determined. Items rated with 3 or 4 were recoded as 1, indicating they were clear and comprehensible, while items rated with 1 or 2 were recoded as 0, indicating they were unclear and incomprehensible. An average evaluation from each rater determined the proportion of clarity and comprehension. When

raters agree 100%, the Universal Agreement (UA) score is 1. If not, the UA score would be 0 [15].

This study did not include content validation as the questionnaire items did not possess any subject domains that needed to be addressed [16]. Additionally, the answer section only required respondents to rate their ability in nutrition literacy as either 'poor', 'fair', or 'good'.

Ethical Approval

Approvals to conduct the research were obtained from the International Islamic University Malaysia Research Ethics Committee (Reference No.: IIUM/504/14/11/2/IREC2024-001) as well as the Pusat Dialisis MUIP. The participants provided their informed consent prior to their involvement in the study.

Data Analysis

Numerical data were presented using descriptive analyses such as means and standard deviations, while categorical data were described using absolute numbers and percentages. The descriptive analyses and tabulation of the FVI were conducted using Microsoft Excel.

Results

Phase 1: Translation

During the expert committee review, a few phrases in the pre-harmonised Malay version of the DSNLS (i.e., '*potasium*' and '*sodium*') were suggested to be substituted with Malay words that originate from Latin terms (i.e., "*kalium*" and "*natrium*"). Furthermore, in Item No. 6, the phrase "*menentukan*" was replaced by "*mengenal pasti*" and the sentence was also harmonised to achieve a more precise meaning.

During pre-testing of the questionnaire, most of the respondents commented that they were more familiar with the terms "*potasium*", "*sodium*" and "*fosfat*" instead of "*kalium*", "*natrium*" and "*fosforus*", respectively. This was because these terms were more commonly used in nutrition

education related to kidney disease. In addition, those terms are also proper Malay terms that are loanwords from the English language [17]. As a result, the researchers unanimously agreed to use the terms suggested by the respondents to ensure optimal clarity and better understanding of the questionnaire in the final harmonised Malay version of DSNLS.

Phase 2: Face Validation

The participants of the assessment included five men (33.3%) and 10 women (66.7%), aged from 24 to 72 years. All participants were Malay and had been undergoing dialysis for a range of six months to 22 years, with an average of 50.5 ± 60.9 months.

Five out of eight items were rated as clear and comprehensible by all the respondents (Table 1). Nevertheless, while Items No. 2, 5, and 6 were not rated as clear and comprehensible by all respondents, they were still included in the questionnaire since the FVI values exceeded the acceptable threshold (≥ 0.87). Based on these findings, the Malay translation of the DSNLS was deemed as a valid instrument to assess nutrition literacy levels among Malaysian hemodialysis patients.

Discussion

Nutrition literacy among hemodialysis patients is important for improving dietary adherence, providing education and support, and encouraging patient empowerment. Not only does nutrition literacy correlate with nutritional status, but it also significantly influences the quality of life. The patients' level of nutrition literacy will influence their choices of nutrients and eating habits, ultimately influencing the progression of kidney disease [11]. Assessing the level of nutrition literacy can serve as a preliminary evaluation of the patient's knowledge and comprehension of their illness with respect to dietary management and their capacity to make the best decisions for their care.

The current research involved five distinct steps in the process of translating the DSNLS into the Malay language, and face validation was conducted along with pre-testing of the translated questionnaire. Throughout the process of translation, several modifications were made to ensure that specific phrases accurately conveyed the intended meaning as initially used in the English version. The use of accurate terms is emphasised in accordance with the content of nutrition education that is often utilised among the public and patients in Malaysia [18,19]. In addition, feedback and comments provided by participants during the cognitive interview were duly reviewed to improve understanding and avoid any ambiguity in the translated material.

Instead of merely focusing on linguistic or literal equivalency, instruments must be translated and adapted to meet established criteria and ensure cultural and conceptual appropriateness [20]. The cultural equivalency of a translated instrument is how relevant and usable a word, idea, scale, or normative structure is to cultural groups other than the one from which it came [21]. The five dimensions of stepwise validation for cross-cultural equivalence include content, semantic, technical, criterion, and conceptual, which are mutually exclusive [22]. An instrument may be cross-culturally equivalent in one or more dimensions but not in others [22,23]. This study examined the content, semantic, and conceptual equivalence of the translated questionnaire through forward and backward translations and expert committee review. It was important that the questionnaire accurately assessed the same theoretical constructs and maintained their meaning in the culture of interest. The literal meaning of the sentence remains unchanged from the original English version, while preserving its context. As a result, translation into Malay did not give rise to any substantial apprehension regarding cultural equivalence. Furthermore, the good FVI values indicated that the Malay version of the DSNLS is clear and comprehensible.

In line with the findings from the study on the development of the other Malay language health literacy questionnaire [24], which reported acceptable S-FVI/Ave values for all domains, our study also demonstrated high S-FVI/Ave values exceeding the accepted threshold. This consistency underscores the robustness and clarity of our questionnaire items, affirming their face validity.

To the best of the authors' knowledge, this translated version of the DSNLS questionnaire is the only questionnaire assessing nutrition literacy among hemodialysis patients in Malay. This is the first study of its kind to produce a Malay version of the scale and have it validated among local dialysis patients. However, it is demographically typical in that these only comprised Malay respondents because the sampling area was confined to an east-coast state in Peninsular Malaysia, even though purposive sampling was used in the sampling method. Regardless, the availability of this assessment tool in a translated version makes it more convenient and wide-reaching for healthcare professionals in Malaysia to determine patient gaps in nutrition knowledge and literacy, enabling them to provide the necessary education, thus improving health literacy in the country.

Conclusion

The Malay version of DSLNS has undergone the translation and face validation processes according to established guidelines. The findings demonstrated good FVI values, indicating its comprehensibility and clarity among the target respondents. This indicates that the Malay DSLNS can be utilized to assess nutrition literacy levels among hemodialysis patients in Malaysia.

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Conflict of interest

The authors declare no conflict of interest.

Authors' contributions

WAMAB, RMY, NS, and NAMS came out with the research concept and design. SMK conducted data collection, ran the analysis, and prepared the manuscript. SMK, WAMAB, RMY, and NAMS were involved during the expert committee review. RMY and NAMS provided advice on data analysis and interpretation of the results and reviewed the manuscript. The manuscript has been approved for publication by all authors.

Table 1. Face validity index for the Malay version of DSNLS (N=15)

Items	Questions							
	1	2	3	4	5	6	7	8
S-FVI/Ave	1.00	0.87	1.00	1.00	0.87	0.93	1.00	1.00
S-FVI/UA	1.00	0	1.00	1.00	0	0	1.00	1.00
Proportion Clarity/Comprehensible	1.00	0.87	1.00	1.00	0.87	0.93	1.00	1.00

S-FVI/Ave: Scale-level face validity index based on the average method; S-FVI/UA: Scale-level face validity index based on the universal agreement method

References

- [1] World Health Organization (WHO). Health Literacy – The Solid Facts. 2013.
- [2] Taylor MK, Sullivan DK, Ellerbeck EF, Gajewski BJ, Gibbs HD. Nutrition literacy predicts adherence to healthy/unhealthy diet patterns in adults with a nutrition-related chronic condition. *Public health nutrition*. 2019;22:2157–2169.
- [3] Silk KJ, Sherry J, Winn B, Keesecker N, Horodynski MA, Sayir A. Increasing nutrition literacy: testing the effectiveness of print, web site, and game modalities. *Journal of nutrition education and behavior*. 2008;40:3-10.

- [4] National Renal Registry. 30th Report of the Malaysian Dialysis and Transplant Registry 2022, Chapter 2: Dialysis in Malaysia. 2022.
- [5] Lim JH. Relationship between Nutrition Literacy and Dietary Adherence Among Hemodialysis Patients from Selected Dialysis Centres in Klang Valley, Malaysia. (Master's thesis). School of Graduate Studies, Universiti Putra Malaysia, Malaysia. 2021.
- [6] Green JA, Mor MK, Shields AM, Sevick MA, Arnold RM, Palevsky PM, Fine MJ, Weisbord SD. Associations of health literacy with dialysis adherence and health resource utilization in patients receiving maintenance hemodialysis. *American journal of kidney diseases : the official journal of the National Kidney Foundation*. 2013;62:73-80.
- [7] Martins C, Campos S, Duarte J, Martins R, Silva D, Chaves C. Health literacy among dialysis patients. *Economic and Social Development*. 2016;270-275.
- [8] Bahadori M, Najari F, Alimohammadzadeh K. The Relationship between Health Literacy and General Health Level of Hemodialysis Patients: A Case Study in Iran. *Nephro-Urol Mon*. 2018;10:e66034.
- [9] Skoumalova I, Kolarcik P, Madarasova Geckova A, Rosenberger J, Majernikova M, Klein D, van Dijk JP, Reijneveld SA. Is Health Literacy of Dialyzed Patients Related to Their Adherence to Dietary and Fluid Intake Recommendations? *Int. J. Environ. Res. Public Health*. 2019;16:4295.
- [10] Shih CL, Chang TH, Jensen DA, Chiu CH. Development of a health literacy questionnaire for Taiwanese hemodialysis patients. *BMC nephrology*. 2016;17:54.
- [11] Li Z, Zhen T, Zhao Y, Zhang J. Development and assessment of a nutrition literacy scale for patients with end-stage kidney disease undergoing dialysis and its correlation with quality of life. *Renal failure*. 2023;45:2162417.

- [12] Sørensen K, Van den Broucke S, Pelikan JM, Fullam J, Doyle G, Slonska Z, Kondilis B, Stoffels V, Osborne RH, Brand H, HLS-EU Consortium. Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q). *BMC public health*. 2013;13:948.
- [13] Geshina AMS. Introduction to forward and backward translations of instruments. Kubang Kerian: Health Campus University Sains Malaysia. 2019.
- [14] Karami SM, Mohd Abu Bakar WA, Mat Ya R, Sulaiman N, Mohd Shukri NA. Dietary Adherence Component of End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ) Translation and Validation. *International Journal of Allied Health Sciences*. 2024;8:2997-3004.
- [15] Yusoff MSB. ABC of response process validation and face validity index calculation. *Education in Medicine Journal*. 2019;11:55-61.
- [16] Fitzpatrick AR. The meaning of content validity. *Applied Psychological Measurement*. 1983;7:3-13.
- [17] Dewan Bahasa dan Pustaka. Pusat Rujukan Persuratan Melayu. <https://prpm.dbp.gov.my>. [Accessed August 12, 2024].
- [18] Kementerian Kesihatan Malaysia. Diet Untuk Pesakit Buah Pinggang Kronik. Bahagian Pembangunan Kesihatan Keluarga, Kementerian Kesihatan Malaysia. <https://ezpamphlets.wordpress.com/wp-content/uploads/2020/01/diet-ckd-1.pdf>; n.d. [Accessed June 6, 2024].
- [19] Kementerian Kesihatan Malaysia. Diet Untuk Penghidap Darah Tinggi. Bahagian Pembangunan Kesihatan Keluarga, Kementerian Kesihatan Malaysia. <https://ezpamphlets.wordpress.com/wp-content/uploads/2020/01/diet-hipertensi-2.pdf>; n.d. [Accessed June 6, 2024].

- [20] Streiner DL, Norman GR, Cairney J. Health measurement scales: A practical guide to their development and use (5th ed.). Oxford University Press. 2015.
- [21] Marsella AJ, Kameoka VA. Ethnocultural issues in the assessment of psychopathology. In S. Wetzler (Ed.), *Measuring mental illness: Psychometric assessment for clinicians*. American Psychiatric Association. 1989;231-256.
- [22] Flaherty JA, Gaviria FM, Pathak D, Mitchell T, Wintrob R, Richman JA et al. Developing instruments for cross-cultural psychiatric research. *Journal of Nervous and Mental Disorders*. 1988;176:257-263.
- [23] Beck CT, Bernal H, Froman RD. (2003). Methods to document semantic equivalence of a translated scale. *Research in nursing & health*. 2003;26:64-73.
- [24] Dalawi I, Isa MR, Chen XW, Azhar ZI, Aimran N. Development of the Malay Language of understanding, attitude, practice and health literacy questionnaire on COVID-19 (MUAPHQ C-19): content validity & face validity analysis. *BMC Public Health*. 2023;23(1):1131.