

## ORIGINAL ARTICLE

# Validation of Malay Language Translated Questionnaire on Adult Intensive Care Unit Nurses' Perception and Involvement in End-of-life Care

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## ABSTRACT

**Introduction:** The study's objective was to validate a Malay language translated questionnaire on end-of-life care to be used among nurses practicing in critical care areas. **Methods:** The English language questionnaire underwent forward and backward translations by four experts. The translated Malay language questionnaire was pilot tested on 30 subjects and revised accordingly. The validation of the revised questionnaire was carried out on 250 nurses. The reliability of the translated questionnaire was checked. Cronbach alpha value of at least 0.70 suggests adequate internal consistency. The validity of the questionnaire was explored using Confirmatory Factor Analysis (CFA) and model fit tests were run to achieve fit test specific cut off values. The CFAs were run repeatedly with iterative item reductions until acceptable goodness of fit for the model was achieved. **Results:** All domains of the translated questionnaire showed reasonable to excellent reliability (Cronbach Alpha 0.687 to 0.922). Multiple CFAs were run and 13 out of 46 items were excluded, and the final model fit improved substantially with the indices were within the acceptable threshold of good or reasonably fit, cut off values are in brackets [Chi-Square statistics 1.635 ( $\leq 2.0$ ), Root Mean Square Error of Approximation 0.050 ( $< 0.05$ ), Standardised Root Mean Square Residual 0.059 ( $\leq 0.08$ ), Comparative Fit Index 0.911 (0.90-0.94), Tucker Lewis Index 0.900 (0.90-0.94), Akaike Information Criteria 13024, Bayesian Information Criteria 13334]. **Conclusion:** The psychometric properties of the final model indicated the Malay language translated questionnaire is reliable and valid to investigate nurses' perspective and involvement in end-of-life care. *Malaysian Journal of Medicine and Health Sciences* (2022) 18(5):13-22. doi:10.47836/mjmhs18.5.3

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## INTRODUCTION

Despite optimal therapy, about 18.3% to 19.9% of patients in intensive care units (ICUs) succumb to their illnesses (1). This could possibly be due to the severity of illness and/or patients' own poor physiological reserve. Unfortunately, some patients were not provided with adequate end-of-life care where unnecessary life-sustaining treatment or procedures were still instituted even though a grave prognosis had been predicted (2). Patients' suffering is prolonged when life support measures are imposed upon them without clinical improvement or with clear deterioration, depriving the patients and their families of honest prognostic information and reducing time to prepare for dying and

bereavement (3,4).

Critical care nurses spend more time with patients under their care and may have more opportunities to communicate with their families. They are also the primary end-of-life care providers alongside the doctors, after decision of limitation or withdrawal of therapy being made (5). Therefore, the nurses may have better understanding of patients and their families' needs, wishes and beliefs, and hence may be able to bridge the communication gap that may exist between the physicians and patients with their families.

A survey done in five medical centres of University of California on ICU bedside nurses reported the main barriers to involvement in end-of-life care communication includes needing for more training (66%), doctors not asking their perspective (60%) and the emotional toll of discussions (43%) (6). They may face tensions and conflict dealing with end-

of-life care in the ICUs due to lack of clear guidance from physicians or protocols, lack of emotional outlets and constructive support from the distressing work experience and handling the responsibilities of ensuring patients' comfort and their families' needs in a highly technological environment (5). The perspective of our ICU nurses in discussing goals of care, providing end-of-life care and barriers encountered would therefore be valuable for the improvement of care quality to our ICU patients.

Adopting a validated questionnaire e.g., one developed by Anderson et. al. to investigate the perspective and involvement of our ICU nurses in end-of-life care will save time and resources from developing a new questionnaire (6). However, Malay language is the lingua franca of majority of Malaysian nurses' population, although most of them have basic conduct of English language. By translating the survey into Malay language, it would more closely measure the intended outcomes in our local setting. This translated questionnaire should be validated and reliable, equivalent to the original English questionnaire, assessing our local nursing population across different cultures and language (7-13). Validation of this translated questionnaire will allow future utility of this questionnaire in larger scale research on this topic to be conducted in our local setting.

## **MATERIALS AND METHODS**

This study was approved by the Medical Research & Ethics Committee (MREC) Universiti Kebangsaan Malaysia Medical Centre (FF-2019-168) and MREC of National Medical Research Register (NMRR), Ministry of Health (MOH) Malaysia (NMRR-18-3666-45567).

This study involved nurses in UKMMC and Hospital Kuala Lumpur (HKL) from the operation theatres, surgical and orthopaedic wards of UKMMC and HKL for validation study who were adequately proficient in both English and Malay language (attained a 'pass' in English and Malay language in the Sijil Pelajaran Malaysia (SPM)). We excluded nurses working in critical care areas of UKMMC and HKL.

### **Study tool and translation of the survey**

The questionnaire for this study was adopted verbatim from survey tool of "ICU Bedside Nurses' Involvement in Palliative Care Communication: A Multicenter Survey" in English language done on ICU nurses in five academic medical centres of the University of California, U.S. by Anderson et. al. with permission using, translating and validating the study tool granted from the primary author. The study was published in 2016 in the Journal of Pain and Symptom Management. The questionnaire was developed by the authors, including bedside critical care nurses, palliative care and critical care advanced practice nurses and nurse educators, a nurse researcher in palliative and critical care and palliative care

physicians. The content was validated by piloting the survey with ten bedside nurses at a centre.

The questionnaire consists of five domains – I, II, III, IV and V, using Likert-type scales for 39 stems or items of the questionnaire and open-ended questions on another two questions for the respondents to freely express their opinions on providing end-of-life care. Domain I consist of two items with 4-point scale-response from "Not important" to "Very important", to assess the nurses' perception to the importance of engaging in communication regarding prognosis and goals of care with patients and/or families. Domain II has eight items, which investigate involvement of nurses into palliative care in the ICUs using four-point scale from "Never" to "Often". Possible barriers which may hinder quality end-of-life care are explored using five-point scale from "Strongly disagree" to "Strongly agree" in 15 items of Domain III, followed by 15 items assessing nurses' confidence level in Domain IV with a four-point scale from "Not confident" to "Very confident". Domain V consists of demographic details of the respondents. The questionnaire takes about ten to fifteen minutes to complete.

### **Study protocol**

We followed guidelines described by Tsang et. al. (7) in validating Malay language translated questionnaire of which the English version that was adopted verbatim from survey tool of "ICU Bedside Nurses' Involvement in Palliative Care Communication: A Multicenter Survey" by Anderson et. al. (6) The steps of translating and validating the questionnaire were as follow:

#### ***Forward translation***

Two independent translators, who are proficient in both English and Malay, translated the questionnaire into Malay language, to better reflect the nuances of the translated Malay version. One of the translators, a senior lecturer in the UKMMC Department of Anaesthesiology and Intensive Care, was aware of the concepts and objectives of the questionnaire, to provide a translation that resembles the original instrument more closely. The second translation was done by a certified professional translator by "Dewan Bahasa Pustaka" and a member of the Malaysian Translators Association who was naive to the outcome measurement so that subtle differences in the original questionnaire can be detected. Discrepancies between the two translators were discussed and resolved between themselves.

#### ***Backward translation***

The forward Malay translation was then independently back translated into English, to reveal any misunderstandings or unclear wordings in the initial forward translation. This backward translation was performed by another two independent, naive translators, who were different from the forward translators, and not aware of the concepts and objectives intended in the

questionnaire, to ensure the accuracy of the translation. The backward translation was done by an intensivist and a neuroanaesthetist who are also well versed in both the languages but not involved in the study and the forward translation. The discrepancies between the two translators were again discussed and resolved.

#### **Expert committee**

This committee consists of the researchers (intensivists, anaesthetists) and the forward and backward translators, with the responsibility of reviewing all versions of the translations and determine whether translated and original versions achieve semantic, idiomatic, experiential, and conceptual equivalence. The discrepancies were resolved, to produce a pre-final version of the translated questionnaire after a consensus on all items was reached. The expert committee were also responsible for the content validity, judging whether the translated questionnaire items are adequate to measure the domain of interest and the construct intended to assess, i.e., the perception and involvement of ICU nurses in end-of-life care in the local ICUs.

#### **Preliminary pilot testing**

The pre-final version of Malay questionnaire was pilot tested on 30 subjects via convenience sampling, to assess whether all items of the questionnaire is comprehensive and acceptable. The sample size of 30 is based on recommendation by medical epidemiologists Perneger et. al. (14) to achieve a reasonable power to detect prevalent problems (e.g., misunderstandings, ambiguities in the translated questionnaire). Problem prevalence of 10% in the questionnaire with a sample size of 30 subjects in the pilot test will achieve high power of 96% to discover the problem (14). After completing the translated questionnaire, the respondents were interviewed within one week of completion of the questionnaire on what the respondents thought of each questionnaire item and their corresponding response meant, the clarity of the questions, language proficiency and easiness to answer. This approach ensured the translated items retain the same meaning as the original items and that there is no confusion regarding the translated questionnaire. Face validity was tested whereby the survey respondents judged the questionnaire items, whether they are meaningful, and able to measure the construct of the questionnaire regarding end-of-life care in ICU. Issues pertaining to the translation were pondered upon, the translated questionnaire was revised accordingly and finalised for the next stage of validation.

#### **Validation of translated questionnaire**

After the pilot study, the revised questionnaire was validated on 250 subjects. Study respondents were chosen via convenience sampling and approached by the primary investigator during weekly Continuing Medical Education (CME) for the doctors or Continuing Nursing Education (CNE) or at the start of their work shift. Once

the respondents agreed for participation in the study, a sealed envelope containing the questionnaire, detailed study participant information sheet and consent form were given to them. To ensure confidentiality of response, the respondents were not required to write their names or any form of identifications on the questionnaire. The names of subjects whom questionnaire have been distributed, had their names marked on the staff name list to avoid the issue of duplicate response.

#### **Dropouts**

Incompletely filled questionnaire was dropped out of the study. Respondents were recruited until sample sizes of 30 and 250 were reached for pilot and validation studies, respectively.

#### **Statistical Analysis**

##### **Sample size calculation**

For Confirmatory Factor Analysis (CFA), it is suggested that a path model with the sample size of 200 or more is necessary for the estimates to be comparably stable (Kline, 2011) (15). Thus, the sample size of 200 was used as a starting value in the simulation study. Sample size determination was done using Monte Carlo simulation in Mplus 7.3 for the measurement model. The estimated parameters used in the simulation are factor loading = 0.4, factor covariances = 0.3 and factor variances = 0.3. Based on the simulation results, the sample size of 200 will achieve minimum power of 0.998. Considering 20% non-response rate,

$$\text{Total sample size required, } x = \frac{\text{Sample size}}{(1-\text{non response rate})}$$

$$\text{Hence, } \frac{200}{(1-0.2)} = 250 \text{ respondents required}$$

##### **Statistical tests**

Data were cleaned and analysed using IBM SPSS version 19.0 (Armonk, NY: IBM Corp.) and Mplus version 7.3 (Los Angeles: Muth n & Muth n). Descriptive statistics were used to describe the characteristics of the nurses and the questionnaire responses. Normality of the data were checked using skewness, kurtosis and histogram. Mean and standard deviation (SD) were used to present numerical variables after normality checking, while categorical variables were presented as frequency and percentage. The responses of the questionnaire were presented in both mean (SD) and frequency (%) for better illustration of the data.

The reliability of the questionnaire was checked and presented with Cronbach alpha. Cronbach's alpha of at least 0.70 suggests adequate internal consistency. Alpha values under 0.50 are unacceptable, from 0.50 to 0.60 are questionable, from 0.60 to 0.70 are acceptable, from 0.70 to 0.80 are good, 0.80 to 0.90 very good, and over 0.90 are considered excellent (17). Another article by Streiner, 2003 suggested that an alpha value that is too

high ( $\alpha \geq 0.90$ ) suggests that some questionnaire items may be redundant (18).

The validity of the questionnaire was explored using CFA. Four latent variables (Domains I, II, III and IV) were analysed. Model fit tests were run, yielding the Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), Chi-Square statistics, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Standardised Root Mean Square Residual (SRMR). The fit indices and their suggested cut-off values are listed in Table I. Standardised parameter estimates – factor loadings, standard errors, R-square, regression coefficients, standardised residuals, and modification indices with parameter greater than ten were obtained. The standardised factor loadings enabled identification of misspecifications for model modification, with value  $<0.4$  as poor factor loading. The analyses were run repeatedly with iterative item reductions until acceptable goodness of fit for the model was achieved.

**RESULTS**

The original English questionnaire items with each corresponding Malay-language translated version after undergoing process of forward and backward translation and finalisation of the Malay translation are shown in Table II.

**Pilot study**

The Malay questionnaire that was pilot tested on 30 subjects included 16 (53.3%) from UKMMC and 14 (46.7%) from HKL. Some amendments were made for better choice of wordings and eloquence, and to minimise deviation of meaning from the original English questionnaire. These were done after interviewing the pilot study respondents and showing them the original questionnaire after completion of the Malay version for comparison.

**Validation study**

There were 137 (54.8%) UKMMC nurses and 113 (45.2%) HKL nurses who responded to the questionnaire.

Their mean year of working as a nurse is 9 years. The responses are presented in Table III.

Majority of the respondents (88.0%) agreed that it is important for families and clinicians engaging in discussion about patient’s prognosis and goals of care. Also, 86.4% respondents felt that it is important for bedside nurses to be involved in the discussion. In terms of involvement in end-of-life care, 73.2% and 84.8% of the nurses do discuss prognosis and goals of care with patients’ families. Greater percentage (93.2% and 88.8%) of the nurses discuss these matters with the physicians. However, less than two thirds of the nurses actually attend and participate in family meetings. About three quarters of nurses discuss palliative care consults with families and physicians.

When asked about potential barriers to involvement in end-of-life care, greater percentage of nurses (68.8%) thinks more training is needed in this area. Other barriers such as unsure of own role in providing end-of-life care, unsupportive physicians and nursing managers and over-busy clinical duties were less frequently reported (less than 30%). Around 60 to 70% of the nurses were confident in performing tasks related to provision of palliative care.

Table IV showed the reliability of the questionnaire. Domain I was shown to have a reasonable reliability, domain II and domain III have good reliability whereas domain IV has excellent reliability.

The parameters in the initial model were further examined. As shown in Table V, two items with item factor loading lower than 0.400 were identified: Item 12 has factor loading of 0.111 and Item 23 with factor loading of 0.387, indicating that these items may not be able to explain the domain well. After seeking experts’ opinion, these two items were removed, and the model improved. Nevertheless, model fit was still not within the acceptable threshold value (Model 2, Table VI).

Referring to Table VI, the model was further examined, and 11 items were removed iteratively due to high

**Table I: Reference of acceptable range for CFA fit indices**

Fit Indices	Symbol	Cut Off Value	Source
<b>Absolute Fit Measures</b>			
Normed Chi-square	$\chi^2 / df$	$\leq 5.0$ indicates a good fit $\leq 2.0$ indicates a good fit	(Wheaton et al, 1977) <sup>19</sup> (Tabachnick and Fidell, 2007) <sup>20</sup>
Standardized Root Mean Square Residual	SRMR	$\leq 0.08$ indicates a good fit	(Kline, 2011) <sup>21</sup>
Root Mean Square of Approximation	RMSEA	$< 0.05$ , model is good fit $\leq 0.08$ , reasonably fit, and $< 0.10$ indicate poor fit	(Kline, 2011) <sup>21</sup>
<b>Incremental Fit Measures</b>			
Comparative Fit Index*	CFI	$\geq 0.95$ , good fit Between 0.90-0.94, reasonably fit	(Kline, 2011) <sup>21</sup>
Tucker Lewis Index*	TLI	$\geq 0.95$ , good fit Between 0.90-0.94, reasonably fit	(Kline, 2011 <sup>21</sup> ; Wang and Wang, 2012 <sup>22</sup> )

**Table II: Items of original questionnaire and items of Malay language translated version.**

Original English Version	Malay Language Translated Version
<p>I. First of all, in your opinion, how important are the following matters in ensuring the quality of care for the critically ill patients in the ICU?</p>	<p><b>I. Pertama sekali, pada pendapat anda, betapa pentingkah perkara-perkara yang berikut dalam memastikan kualiti penjagaan bagi pesakit tenat di ICU?</b></p>
<p>1. Patient's families are involved in discussion with the doctors on patients prognosis and goal of care. 2. Nurse in-charge is involved in the discussion with patient's families and doctors on patient's prognosis and goal of care.</p>	<p>1. Ahli keluarga pesakit dan para doktor terlibat sama dalam perbincangan tentang prognosis dan matlamat penjagaan pesakit 2. Jururawat incai terlibat sama dalam perbincangan dengan ahli keluarga pesakit dan para doktor mengenai prognosis dan matlamat penjagaan pesakit</p>
<p>II. How frequent are you, as the nurse in-charge, involved in the following matters?</p>	<p><b>II. Sekerap mana anda sebagai jururawat incai melakukan perkara-perkara yang berikut?</b></p>
<p>3. Discuss about prognosis with patient's families 4. Discuss about goal of care with patient's families 5. Discuss about prognosis with the attending doctors 5. Discuss about goal of care with the attending doctors 7. Attending family meeting 8. Participate in family meeting 9. Discuss about palliative care with patient's families 10. Discuss about palliative care consultation with doctors</p>	<p>3. Berbincang tentang prognosis dengan ahli keluarga pesakit 4. Berbincang tentang matlamat penjagaan dengan ahli keluarga pesakit 5. Berbincang tentang prognosis dengan doktor yang merawat pesakit 6. Berbincang tentang matlamat penjagaan dengan doktor yang merawat pesakit 7. Menghadiri perjumpaan dengan ahli keluarga pesakit 8. Terlibat dalam perjumpaan dengan ahli keluarga pesakit 9. Berbincang tentang penjagaan paliatif dengan ahli keluarga pesakit 10. Berbincang tentang rundingan penjagaan paliatif dengan doktor</p>
<p>III. Please indicate your degree of agreement regarding the potential barriers in your involvement in the discussion with family members and doctors regarding patient's prognosis, goal of care, and palliative care:</p>	<p><b>III. Sila nilaikan tahap persetujuan anda tentang halangan-halangan yang berkeungkinan berlaku semasa penglibatan anda dalam perbincangan dengan ahli keluarga dan para doktor berkenaan prognosis pesakit, matlamat penjagaan dan penjagaan paliatif</b></p>
<p>11. I am not sure about my role in discussing prognosis, goal of care and palliative care 12. I need more training to discuss prognosis, goal of care, and palliative care 13. I am not sure how to voice out issue regarding prognosis and goal of care with patient's families 14. I do not feel that the doctors support my involvement in these discussions 15. Doctors do not ask for my perspective on prognosis, goal of care, and palliative care 16. I do not have time to discuss about prognosis and goal of care. 17. I do not have time to attend family meeting 18. It is difficult to obtain replacement to care for my patient so that I am able to attend family meeting 19. My nurse manager does not support my involvement in these discussions 20. I do not know when or where family meeting is held 21. I am not invited to attend family meeting. 22. Involvement in such discussions is emotionally taxing 23. Patient's families have negative reactions towards palliative care 24. Doctors have negative reactions towards palliative care 25. Please list down the other factors that you think may limit your involvement in discussion regarding prognosis, goal of care and palliative care.</p>	<p>11. Saya tidak pasti tentang peranan saya dalam membincangkan prognosis, matlamat penjagaan dan penjagaan paliatif 12. Saya memerlukan lebih latihan untuk membincangkan prognosis, matlamat penjagaan dan penjagaan paliatif 13. Saya tidak pasti bagaimana untuk mengutarakan isu mengenai prognosis dan matlamat penjagaan dengan ahli keluarga pesakit 14. Saya tidak merasakan bahawa para doktor menyokong penglibatan saya dalam perbincangan-perbincangan ini 15. Para doktor tidak meminta perspektif saya tentang prognosis, matlamat penjagaan dan penjagaan paliatif 16. Saya tidak mempunyai masa untuk berbincang tentang prognosis dan matlamat penjagaan 17. Saya tidak mempunyai masa untuk menghadiri perjumpaan dengan ahli keluarga pesakit 18. Sukar untuk mendapatkan pengganti untuk menjaga pesakit saya supaya saya dapat menghadiri perjumpaan dengan ahli keluarga pesakit 19. Pengurus jururawat saya tidak menyokong penglibatan saya dalam perbincangan sebegini 20. Saya tidak tahu bila atau di mana perjumpaan dengan keluarga pesakit diadakan 21. Saya tidak dijemput untuk menghadiri perjumpaan dengan ahli keluarga pesakit 22. Penglibatan dalam perbincangan sebegini membebaskan emosi 23. Ahli keluarga pesakit mempunyai reaksi negatif terhadap penjagaan paliatif 24. Para doktor mempunyai reaksi negatif terhadap penjagaan paliatif 25. Sila senaraikan factor-faktor lain yang anda rasa menghadkan penglibatan anda di dalam perbincangan mengenai prognosis, matlamat penjagaan dan penjagaan paliatif:</p>
<p>IV. Please indicate your level of confidence in carrying out each of the following tasks:</p>	<p><b>IV. Sila nilaikan tahap keyakinan anda dalam melaksanakan setiap tugas berikut</b></p>
<p>26. Evaluate families' understanding regarding patient's prognosis. 27. Evaluate families' understanding regarding goal of care. 28. Identify families' needs to obtain information regarding patient's illness and treatment 29. Identify and respond to families' emotional distress 30. Obtain doctor's perspective on patient's prognosis 31. Obtain doctor's understanding regarding goal of care for the patient. 32. Convey families' needs to communicate with the doctors 33. Inform families' need for family meeting to the doctors 34. Arrange meeting between patient's family and doctors 35. Actively participate and contribute in family meeting. 36. Explain palliative care. 37. Inform the value of palliative care consultation to doctor 38. Explain about palliative care and how it is useful for patient to the family 39. Ensure patient and family members receive palliative care when required 40. Practice personal care to avoid being physically and emotionally fatigued.</p>	<p>26. Menilai pemahaman ahli keluarga tentang prognosis pesakit 27. Menilai pemahaman ahli keluarga terhadap matlamat penjagaan pesakit 28. Mengenal pasti keperluan ahli keluarga untuk mendapatkan maklumat mengenai penyakit dan rawatan pesakit 29. Mengenal pasti dan memberi maklum balas terhadap tekanan emosi ahli keluarga pesakit 30. Mendapatkan perspektif doktor mengenai prognosis pesakit 31. Mendapatkan pemahaman doktor tentang matlamat penjagaan pesakit 32. Menyampaikan keperluan komunikasi keluarga pesakit kepada para doktor 33. Memberitahu keperluan untuk melakukan perjumpaan keluarga pesakit kepada para doktor 34. Mengatur perjumpaan antara keluarga pesakit dan para doktor 35. Terlibat secara aktif dan menyumbang dalam perjumpaan dengan ahli keluarga 36. Memperjelaskan penjagaan paliatif 37. Memberitahu nilai perundingan penjagaan paliatif kepada doktor 38. Menerangkan penjagaan paliatif dan bagaimana ia berguna untuk pesakit kepada ahli keluarga 39. Memastikan pesakit dan ahli keluarga mendapat penjagaan paliatif bila perlu 40. Menggunakan amalan penjagaan kendirian untuk mengelakkan keletihan dari segi fizikal dan emosi</p>
<p>V. Finally, please tell us a little about yourself:</p>	<p><b>V. Akhir sekali, sila beritahu serba sedikit mengenai diri anda</b></p>
<p>41. How many years have you been working as a nurse? 42. How many years have you been working as an ICU nurse? 43. Please choose the medical center you are working in (research medical center listed): 44. Please choose the main unit you work in (all ICUs in research medical center listed): 45. Please select your main shifts: 46. Please share any thoughts and other comments:</p>	<p>41. Berapa tahunkah anda bekerja sebagai jururawat? 42. Berapa tahunkah anda bekerja sebagai jururawat di ICU? 43. Sila pilih pusat perubatan tempat anda bekerja (pusat perubatan kajian tersenarai): 44. Sila pilih unit bekerja anda yang utama (semua ICU dalam pusat perubatan kajian tersenarai) 45. Sila pilih syif bekerja anda yang utama 46. Sila kongsi sebarang pendapat dan komen yang lain</p>

**Table III: Questionnaire responses for validation cohort**

I. First, how important do you feel the following are to the quality of care for seriously ill ICU patients?							
Item	Question	Mean (SD)	Range	Frequency (%)			
				Not Important	Somewhat Important	Important	Very Important
1	Families and clinicians engaging in discussions about patient prognosis and goals of care	3.33 (0.74)	1-4	5 (2.0)	25 (10.0)	102 (40.8)	118 (47.2)
2	Bedside nurses engaging in discussions with families and physicians about patient prognosis and goals of care	3.26 (0.71)	1-4	2 (0.8)	32 (12.8)	114 (45.6)	102 (40.8)

  

II. How often do you as a bedside nurse do the following?							
Item	Question	Mean (SD)	Range	Frequency (%)			
				Never	Rarely	Sometimes	Often
3	Discuss prognosis with patients' families	2.87 (0.85)	1-4	20 (8.0)	47 (18.8)	128 (51.2)	55 (22.0)
4	Discuss goals of care with patients' families	3.19 (0.75)	1-4	6 (2.4)	32 (12.8)	120 (48.0)	92 (36.8)
5	Discuss prognosis with patients' physicians	3.44 (0.63)	1-4	1 (0.4)	16 (6.4)	106 (42.4)	127 (50.8)
6	Discuss goals of care with patients' physicians	3.44 (0.71)	1-4	2 (0.8)	26 (10.4)	81 (32.4)	141 (56.4)
7	Attend family meetings	2.75 (0.95)	1-4	31 (12.4)	58 (23.2)	103 (41.2)	58 (23.2)
8	Participate in family meetings	2.73 (0.97)	1-4	32 (12.8)	63 (25.2)	95 (38.0)	60 (24.0)
9	Discuss palliative care consults with families	2.92 (0.90)	1-4	21 (8.4)	49 (19.6)	109 (43.6)	71 (28.4)
10	Discuss palliative care consults with physicians	2.98 (0.86)	1-4	17 (6.8)	43 (17.2)	118 (47.2)	72 (28.8)

  

III. Please rate your level of agreement with the following potential barriers to your involvement in discussions with families and clinicians about patient prognosis, goals of care, and palliative care:								
Item	Question	Mean (SD)	Range	Frequency (%)				
				Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11	I am unsure of my role in discussing prognosis, goals of care, and palliative care	2.60 (0.86)	1-5	20 (8.0)	99 (39.6)	95 (38.0)	33 (13.2)	3 (1.2)
12	I need more training in how to discuss prognosis, goals of care, and palliative care	3.67 (0.79)	1-5	3 (1.2)	20 (8.0)	55 (22.0)	151 (60.4)	21 (8.4)
13	I am not sure how to bring up prognosis and goals of care with families	2.95 (0.88)	1-5	5 (2.0)	80 (32.0)	94 (37.6)	64 (25.6)	7 (2.8)
14	I do not feel that physicians support my involvement in these discussions	2.70 (0.89)	1-5	18 (7.2)	91 (36.4)	92 (36.8)	46 (18.4)	3 (1.2)
15	Physicians do not ask for my perspectives on prognosis, goals of care, and palliative care	2.88 (0.93)	1-5	11 (4.4)	82 (32.8)	90 (36.0)	59 (23.6)	8 (3.2)
16	I do not have time for bedside discussions of prognosis and goals of care	2.46 (0.92)	1-5	33 (13.2)	106 (42.4)	78 (31.2)	29 (11.6)	4 (1.6)
17	I do not have time to attend family meetings	2.51 (0.98)	1-5	37 (14.9)	94 (37.8)	75 (30.1)	39 (15.6)	4 (1.6)
18	It is hard to get coverage for my patients so I can attend family meetings	2.98 (1.03)	1-5	15 (6.0)	70 (28.0)	90 (36.0)	55 (22.0)	20 (8.0)
19	My managers do not support my involvement in these discussions	2.48 (0.85)	1-5	25 (10.0)	111 (44.4)	85 (34.0)	27 (10.8)	2 (0.8)
20	I do not know when or where family meetings are occurring	2.63 (0.95)	1-5	23 (9.2)	100 (40.0)	79 (31.6)	42 (16.8)	6 (2.4)
21	I am not invited to family meetings	2.89 (0.99)	1-5	18 (7.2)	75 (30.0)	82 (32.8)	66 (26.4)	9 (3.6)
22	Engaging in these discussions is emotionally draining	2.76 (0.97)	1-5	15 (6.0)	99 (39.6)	75 (30.0)	52 (20.8)	9 (3.6)
23	Families have negative reactions to palliative care	2.90 (0.80)	1-5	8 (3.2)	66 (26.4)	124 (49.6)	48 (19.2)	4 (1.6)
24	Physicians have negative reactions to palliative care	2.40 (0.74)	1-4	25 (10.0)	112 (44.8)	100 (40.0)	13 (5.2)	0 (0.0)

  

IV. Please rate your level of confidence to perform each of the following tasks:							
Item	Question	Mean (SD)	Range	Frequency (%)			
				Not Confident	Somewhat Confident	Confident	Very Confident
26	Assess a family's understanding of a patient's prognosis	2.56 (0.69)	1-4	23 (9.2)	69 (27.6)	152 (60.8)	6 (2.4)
27	Assess a family's understanding of a patient's goals of care	2.73 (0.61)	1-4	8 (3.2)	66 (26.4)	162 (64.8)	14 (5.6)
28	Identify a family's needs for information about a patient's illness and treatments	2.67 (0.67)	1-4	16 (6.4)	63 (25.2)	159 (63.6)	12 (4.8)
29	Identify and respond to family members' emotional distress	2.71 (0.57)	1-4	10 (4.0)	57 (22.8)	178 (71.2)	5 (2.0)
30	Elicit a physician's perspectives on a patient's prognosis	2.77 (0.63)	1-4	10 (4.0)	55 (22.0)	168 (67.2)	17 (6.8)
31	Elicit a physician's understanding of a patient's goals of care	2.81 (0.57)	1-4	5 (2.0)	53 (21.2)	176 (70.4)	16 (6.4)
32	Convey a family's communication needs to a physician	2.90 (0.55)	1-4	6 (2.4)	33 (13.2)	190 (76.0)	21 (8.4)
33	Communicate the need for a family meeting to a physician	2.82 (0.63)	1-4	10 (4.0)	46 (18.4)	174 (69.6)	20 (8.0)
34	Arrange a meeting between a patient's family and clinicians	2.68 (0.73)	1-4	23 (9.2)	50 (20.0)	160 (64.0)	17 (6.7)
35	Be an active, contributing participant in a family meeting	2.52 (0.82)	1-4	39 (15.6)	56 (22.4)	142 (56.8)	13 (5.2)
36	Define palliative care	2.59 (0.68)	1-4	20 (8.0)	71 (28.4)	151 (60.4)	8 (3.2)
37	Communicate the value of palliative care consultation to a physician	2.54 (0.76)	1-4	27 (10.8)	75 (30.0)	134 (53.6)	14 (5.6)
38	Describe palliative care and how it can be useful to a patient's family	2.74 (0.67)	1-4	16 (6.4)	49 (19.6)	169 (67.6)	16 (6.4)
39	Ensure that patients and families receive palliative care when needed	2.76 (0.59)	1-4	11 (4.4)	48 (19.2)	181 (72.4)	10 (4.0)
40	Use self-care practices to prevent burnout and compassion fatigue	2.68 (0.71)	1-4	19 (7.6)	55 (22.0)	165 (66.0)	11 (4.4)

**Table IV: Reliability of the questionnaire**

Domains	Cronbach Alpha
I Important components of quality care	0.687
II Task performed for quality care	0.861
III Level of agreement with potential barriers	0.868
IV Level of confidence in performing tasks	0.922

**Table V: Factor loading and composite reliability of the models**

Item	Questions	Initial	Mod-el 2	Mod-el 3	Final	Com-posite Reliability
<b>I. First, how important do you feel the following are to the quality of care for seriously ill ICU patients?</b>						
1	Families and clinicians engaging in discussions about patient prognosis and goals of care	0.679	0.678	0.710	0.686	0.688
2	Bedside nurses engaging in discussions with families and physicians about patient prognosis and goals of care	0.772	0.773	0.739	0.765	(0.609, 0.767)
<b>II. How often do you as a bedside nurse do the following?</b>						
3	Discuss prognosis with patients' families	0.631	0.631	0.607	0.706	
4	Discuss goals of care with patients' families	0.565	0.565	-	-	
5	Discuss prognosis with patients' physicians	0.567	0.567	0.586	0.580	0.827
6	Discuss goals of care with patients' physicians	0.567	0.567	-	-	(0.788, 0.866)
7	Attend family meetings	0.700	0.700	-	-	
8	Participate in family meetings	0.737	0.737	-	-	
9	Discuss palliative care consults with families	0.758	0.758	0.775	0.725	
10	Discuss palliative care consults with physicians	0.759	0.759	0.810	0.879	
<b>III. Please rate your level of agreement with the following potential barriers to your involvement in discussions with families and clinicians about patient prognosis, goals of care, and palliative care:</b>						
11	I am unsure of my role in discussing prognosis, goals of care, and palliative care	0.459	0.456	0.433	0.420	
12	I need more training in how to discuss prognosis, goals of care, and palliative care	0.111	-	-	-	
13	I am not sure how to bring up prognosis and goals of care with families	0.541	0.536	0.543	0.526	
14	I do not feel that physicians support my involvement in these discussions	0.572	0.570	-	-	
15	Physicians do not ask for my perspectives on prognosis, goals of care, and palliative care	0.613	0.609	0.550	0.561	
16	I do not have time for bedside discussions of prognosis and goals of care	0.704	0.713	-	-	0.895
17	I do not have time to attend family meetings	0.746	0.753	0.724	0.738	(0.872, 0.917)
18	It is hard to get coverage for my patients so I can attend family meetings	0.594	0.594	0.567	0.581	
19	My managers do not support my involvement in these discussions	0.716	0.715	0.730	0.737	
20	I do not know when or where family meetings are occurring	0.678	0.680	0.735	0.693	
21	I am not invited to family meetings	0.720	0.724	0.760	0.724	
22	Engaging in these discussions is emotionally draining	0.448	0.428	0.446	0.457	
23	Families have negative reactions to palliative care	0.387	-	-	-	
24	Physicians have negative reactions to palliative care	0.539	0.516	0.498	0.509	

**Table V: Factor loading and composite reliability of the models (Continues.....)**

Item	Questions	Initial	Mod-el 2	Mod-el 3	Final	Com-posite Reliability
<b>IV. Please rate your level of confidence to perform each of the following tasks:</b>						
26	Assess a family's understanding of a patient's prognosis	0.518	0.518	0.489	0.493	
27	Assess a family's understanding of a patient's goals of care	0.598	0.598	-	-	
28	Identify a family's needs for information about a patient's illness and treatments	0.717	0.717	-	-	
29	Identify and respond to family members' emotional distress	0.684	0.684	0.638	0.647	
30	Elicit a physician's perspectives on a patient's prognosis	0.601	0.601	0.558	0.560	
31	Elicit a physician's understanding of a patient's goals of care	0.569	0.569	-	-	
32	Convey a family's communication needs to a physician	0.678	0.678	-	-	0.919
33	Communicate the need for a family meeting to a physician	0.640	0.640	0.570	0.575	(0.898, 0.941)
34	Arrange a meeting between a patient's family and clinicians	0.687	0.687	-	-	
35	Be an active, contributing participant in a family meeting	0.735	0.735	0.745	0.710	
36	Define palliative care	0.755	0.755	0.773	0.775	
37	Communicate the value of palliative care consultation to a physician	0.756	0.756	0.808	0.782	
38	Describe palliative care and how it can be useful to a patient's family	0.778	0.778	0.794	0.806	
39	Ensure that patients and families receive palliative care when needed	0.715	0.716	0.739	0.753	
40	Use self-care practices to prevent burnout and compassion fatigue	0.598	0.598	0.632	0.625	

**Table VI: Comparison of fit indices for initial and final model**

Mod-els	$\chi^2/df$	RMSEA (90%CI)	SRMR	CFI	TLI	AIC
Initial	6.630	0.084 (0.079, 0.088)	0.074	0.707	0.688	19225
Model 2	2.727	0.083 (0.078, 0.088)	0.071	0.728	0.709	18063
Model 3	1.812	0.057 (0.049, 0.065)	0.060	0.885	0.873	13088
Final	1.635	0.050 (0.042, 0.058)	0.059	0.911	0.900	13024

standardized residual and suggested in the modification indices to correlate with item among different factor (Model 3, Table V). Modified Model 3 has acceptable RMSEA [0.060 (0.049, 0.065)] and SRMR (0.060); however, CFI and TLI still showed relatively weak model fit.

Table VI compared the fit indices of the CFA model. The initial model seemed to have poor model fit in terms of RMSEA [0.084 (0.079, 0.088)], CFI (0.707) and TLI (0.688); whereas the SRMR of the model was within the

acceptable threshold (0.074). The covariance residual values among the following items were checked and added iteratively. A total of four items' residuals were added to the model: Item 13 with Item 11, Item 37 with Item 35, Item 21 with Item 20, and Item 10 with Item 03. The model improved substantially, and the fit indices were within the acceptable threshold value, with improvement of AIC (Final, Table V).

## DISCUSSION

A questionnaire is a useful tool to gather information from respondents on behaviour, attitudes, preferences, opinions, and knowledge, to test the research question or hypothesis. Questionnaire design that is stringent and assiduous will be helpful to yield useful data. Constructing a new questionnaire may be time consuming, complex and laborious to reduce errors of comprehension and ensure quality of information obtained (23). Hence, to adapt and translate an established questionnaire with documented validity in other languages is an alternative to constructing a new questionnaire from scratch. There is also lack of study which investigates the ICU nurses' perspective in end-of-life care in the local setting to date, while Malay language being the main language used by the nurses.

This research strived to produce an equivalent Malay language questionnaire to the original one in English on ICU nurses' involvement in palliative care. Meticulous forward and backward translations, comparison to the original version and revisions of the translation by bilingual translators / experts were pivotal to achieve cross-cultural adaptation, semantic, idiomatic, experiential, conceptual equivalence (7,10,24).

After reliability was tested on the translated questionnaire using Cronbach alpha, we proceeded to validation with CFA, which is a powerful statistical tool of structural equation modelling (SEM) (26,27). Confirmatory Factor Analysis is often recommended for developing and refining measurement instruments, testing construct validity, and identifying method effects, allowing fixing of the models, assessing the goodness of fit of the proposed theoretical model to the collected data (25). Thus, it is a crucial statistical tool for social and behavioural sciences' validation (25,27). Exploration of the nature and relations among latent constructs (i.e., attitudes, perceptions, common clinical practice in this questionnaire) can be done (28). A priori hypotheses about relations between observed variables (e.g., degree of involvement, confidence level) and latent variables or factors were examined using CFA (28).

We first evaluated the measurement model (whether the measured variables accurately reflect the desired constructs) by looking into the factor loading of each item in the questionnaire. We adopted the threshold of 0.4 as the lowest factor loading (29,30). Hence items

with factor loading below 0.4 were removed, as they may not be effective measures, or they are of poor relevance to our intended construct in end-of-life care (30).

Goodness of fit for the models in this study was expressed using absolute fit indices ( $\chi^2/df$  and RMSEA), incremental fit indices (CFI and TLI) and residual based index (SRMR). The  $\chi^2$  test is sensitive to the sample size: The larger the sample size, the more likely the results of the test become significant at a threshold of 0.05 (the model is considered discrepant from the population's true covariance structure) (31) and hence indicating poor model fit (30,32,33). To minimise the impact of sample size on the model  $\chi^2$ , normed chi-square ( $\chi^2/df$ ) is used instead (19,33), with acceptable ratio ranging 2.0 to 5.0 (19,20). Hu and Bentler also suggested to test at least two different types of fit indices of different properties, in addition to the  $\chi^2$  statistics, to better examine the model from different angles (21,34).

Studies have shown that RMSEA, centrality index (CI), SRMR, TLI, non-normed fit index (NNFI), relative non centrality index (RNI), CFI, and Bollen's delta 2 tend to perform well with respect to detecting model misspecification and lack of dependence on size (28,30,35-39). Root Mean Square Error of Approximations are "estimates the amount of error of approximation per model degree of freedom and takes sample size into account" (21). Comparative Fit Index and TLI express the degree to which the tested model accounts for the variance in the data in relation to a baseline model whereas the SRMR indicates the average value of the standardised residuals between observed and predicted covariances (30). The standardised residuals may reveal whether specific variables or relations are being accounted for (28,40,41). The residuals should be small and centred around zero. Large residuals result in poorly fitting model (34). Standardised residual covariances also provide information about the source of misfit in poorly fitting models (42).

After running CFA and improving the models, the final model with good fit indices had a total of 13 items removed, resulting in the 33-item Malay version questionnaire. Large sample size of 250 subjects were recruited, which was more than necessary for stable estimates of CFA, as Kline suggested for at least 200 sample size (15). The sample also consisted of clinical health care providers who are proficient in both English and Malay language, involving two tertiary hospitals.

As for limitations, the responses from our study population of non-critical care nurses may not reflect the exact construct in the ICU setting amongst the nurses, although nurses in the ward may have experience in end-of-life care in patients who are terminally ill. To justify our choice and decision, the study exclusion criterion was designed as such to avoid overlapping of study subject

in future studies using this validated Malay language questionnaire on the ICU nurses. It was also challenging to appropriately produce equivalent translation to retain the meaning from the original English items, particularly Item 40 in Domain IV (Use self-care practices to prevent burnout and compassion fatigue) which was translated as “Menggunakan amalan penjagaan kendirian untuk mengelakkan kepenatan yang melampau dan kelesuan perasaan belas kasihan” after much deliberation within the expert committee. Despite the struggle to translate that item, many respondents from both pilot and validation studies asked for clarification on the meaning of the BM translation.

As the respondents were shown the English version, majority of them agreed that there seem to be no analogous terms in Malay language especially for ‘burnout’ and ‘compassion fatigue’, and they could not offer any better phrases to improve the translation. Difference between understanding of the English and Malay versions may affect the psychometric analyses of the questionnaire. It may be prudent to include the English phrases for the said item to aid respondents’ comprehension.

## CONCLUSION

The psychometric properties of the final model indicated the Malay language translated questionnaire is reliable and valid to investigate nurses’ perspective and involvement in end-of-life care. Future studies may be done on validating translated questionnaire into other main languages used locally e.g., Chinese and Tamil.

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