



Adaptation and validation of the Chinese version of the Hospice Comfort Questionnaire-Patient (HCQ-P)

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ABSTRACT

Objective. The Hospice Comfort Questionnaire-Patients (HCQ-P) is widely used to assess patient's comfort levels in hospice care. This research aimed to culturally adapt the HCQ-P for the Chinese context and validate its psychometric properties to ensure its applicability and effectiveness in China.

Methods. This research was conducted in two main phases: (1) translation and cross-cultural adaptation of the HCQ-P into Chinese, (2) evaluation of the psychometric properties through expert consultations and a cross-sectional survey among 360 hospice care patients. The evaluation included determining floor and ceiling effects, evaluating internal consistency using Cronbach's α , and testing test-retest reliability with the intra-class correlation coefficient (ICC). Content validity was assessed using the content validity index (CVI), and construct validity was tested through confirmatory factor analysis (CFA).

Results. The HCQ-P was successfully translated and culturally adapted into Chinese, with no significant floor or ceiling effects detected. The overall Cronbach's α for the HCQ-P was 0.94, demonstrating excellent internal consistency, while dimension-specific alphas ranged from 0.77 to 0.84. The overall ICC was 0.93, indicating high test-retest reliability, with individual dimensions ranging from 0.77 to 0.81. Both item-level and scale-level CVIs reached 1, reflecting unanimous expert agreement on content relevance. Significant factor loadings in the CFA confirm that the HCQ-P is statistically robust and well-aligned with the cross-cultural and clinical contexts of Chinese hospice care.

Conclusions. The Chinese version of the HCQ-P exhibits robust psychometric properties, making it a valid and reliable instrument for assessing patient comfort in Chinese hospice care settings.

Subjects Nursing, Statistics, Palliative Care, Healthcare Services

Keywords Hospice care, Cross-cultural adaptation, Psychometric properties, Hospice comfort questionnaire

INTRODUCTION

Hospice care is a patient-centered approach that aims to enhance comfort and preserve dignity during the end-of-life period. Introduced by *Saunders (1978)*, it emphasizes pain relief, symptom management, and psychospiritual and spiritual support to help patients

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face their final stages with dignity while providing emotional support to families and caregivers. As global awareness of quality of life grows, hospice care is increasingly accepted and expanded to include various stages of treatment for serious chronic diseases. According to the WHO, approximately 40 million people need palliative care each year, with 78% living in low- and middle-income countries, but only about 14% have access to such services. The demand for palliative care is expected to double by 2060. In China, hospice care has advanced since the release of the Guidelines for Hospice Care Practice (Trial) in 2017, forming a diversified service model. However, it remains in its infancy with incomplete national legislation, though the 2023 launch of the third batch of hospice care pilot projects marks a new phase toward national expansion.

Comfort in hospice care is considered both a personalized and holistic experience, serving as a source of patient satisfaction and well-being, and plays a vital role in high-quality care (Trotte & Caldas, 2015). It reflects both the individualized subjective experience and the quality of healthcare. Various comfort assessment tools have been developed globally to address different populations, covering patients, professional caregivers, and family caregivers. Comfort assessment tools for patients include observer-rated scales and self-reported scales.

Among observer-rated tools, the Comfort Scale (CS) (Ambuel et al., 1992) simulates ICU nurses' clinical judgment regarding patient distress. The Comfort Behavior Scale (CBS), a revision of the CS by Carnevale & Razack (2002), was initially used to assess sedation in pediatric resuscitation for intubated children (Carnevale & Razack, 2002; Ista et al., 2005) and later applied widely in pediatric intervention evaluations (Koopman et al., 2018; Hazwani et al., 2022; Liu & Ge, 2019; Bai et al., 2012). The End-of-Life Dementia Comfort Assessment Scale (EOLD-CAD) evaluates symptom control in dementia patients at the end of life (Volicer, Hurley & Blasi, 2001), and was validated by Kiely et al. (2006) and Yeh et al. (2021) for hospice care interventions. For self-reported tools, the Visual Analog Scale (VAS) was initially designed to assess pain intensity (Woodforde & Merskey, 1972) but is widely used to evaluate subjective comfort experiences (Li, Liu & Herr, 2007; Bozdemir et al., 2022), though limited to a single dimension. Other scales, like the Subjective Well-being Scale (SWN) (Naber et al., 2001) and the Patient Evaluation of Emotional Comfort Experienced (PEECE) (Williams et al., 2017), have limited target audiences. The General Comfort Questionnaire (GCQ), developed by Kolcaba (1992), evaluates comfort from both dimensional and hierarchical perspectives and has been widely applied due to its high reliability and validity (Góis et al., 2018; Vicdan, 2020; Hu, Xu & Xu, 2023). For professional caregivers, comfort assessment tools focus on emotional experiences in nursing practice. The Nurse Comfort Questionnaire (NCQ) (Cinar Yucel et al., 2019) assesses nurses' comfort in end-of-life care, correlating it with care quality. The Comfort with Communication in Palliative Care Scale (C-COPE) (Isaacson & Minton, 2018) evaluates healthcare providers' comfort in communication during hospice care (Styes & Isaacson, 2021; Wittenberg et al., 2022) and has been applied in Chinese studies (Ji et al., 2023). For family caregivers, the Family Caregiver Comfort in Critical Care Scale (ECONF) (Freitas, Menezes & Mussi, 2015) evaluates their sense of security, social support, and family interaction.

Despite these tools, the field faces challenges. Internationally, the Hospice Comfort Questionnaire (HCQ), adapted from the GCQ, is preferred for assessing the comfort of hospice patients and caregivers (Novak et al., 2001). It includes two subscales: the Hospice Comfort Questionnaire-Patient (HCQ-P) and Hospice Comfort Questionnaire-Caregiver (HCQ-C), covering physical, psychospiritual, sociocultural, and environmental dimensions. Designed for hospice populations, the HCQ is accurate and reliable, addressing patients' unique end-of-life needs, such as pain management and symptom relief. International applications show it is effective in guiding medical decisions and interventions. In contrast, hospice care comfort assessment in China is relatively underdeveloped, relying on the Chinese version of the GCQ (Bian, 2022; Mei et al., 2021; Zhao, Huang & Jin, 2020). There is no universally recommended tool for evaluating hospice patient and caregiver comfort (Lorente, Losilla & Vives, 2018). Thus, there is an urgent need for a comprehensive, targeted assessment tool in China. Moreover, research on comfort factors in hospice care is limited, and a holistic approach is needed to analyze factors affecting both patients' and caregivers' comfort, to improve overall care.

In response, this study aims to introduce the Hospice Comfort Questionnaire-Patients (HCQ-P) to China, conducting translation, cultural adaptation, and psychometric validation. The study will also integrate cross-sectional surveys and literature reviews to identify key factors influencing the comfort of hospice patients and caregivers, ultimately providing a precise comfort assessment tool to improve hospice care quality and optimize intervention strategies.

METHODS

In this research, we utilized the HCQ-P adapted from the GCQ. The HCQ-P encompasses four dimensions of comfort: physical, psychospiritual, Sociocultural, and environmental, structured into 49 items scored on a six-point Likert scale ranging from strongly disagree to strongly agree. The total scores vary from 49 to 294, with higher scores indicating greater comfort levels. Specifically, items 2, 5, 6, 12, 13, 14, 17, 19, 21, 22, 24, 25, 26, 27, 30, 32, 34, 38, 39, 40, 43, 45, and 48 are reverse-scored to ensure that a higher numerical response consistently reflects a higher comfort level. The research was executed in two phases (see Fig. 1): (1) Translation and cross-cultural adaption, and (2) Psychometric evaluation. Ethical approval was obtained from Peking University biomedical ethics committee (Approval No. IRB00001052-24038).

Phase 1: Translation and cross-cultural adaption

To adapt and validate the HCQ-P into Chinese, a systematic translation and cultural adaptation process was conducted in accordance with established guidelines after getting permission from the HCQ-P developer. The detailed steps were as follows:

Step 1: Forward translation

Two bilingual translators, both postgraduates majoring in nursing and fluent in English and Chinese, independently translated the original HCQ-P into Chinese. This step resulted in two initial forward translations (FT1 and FT2).

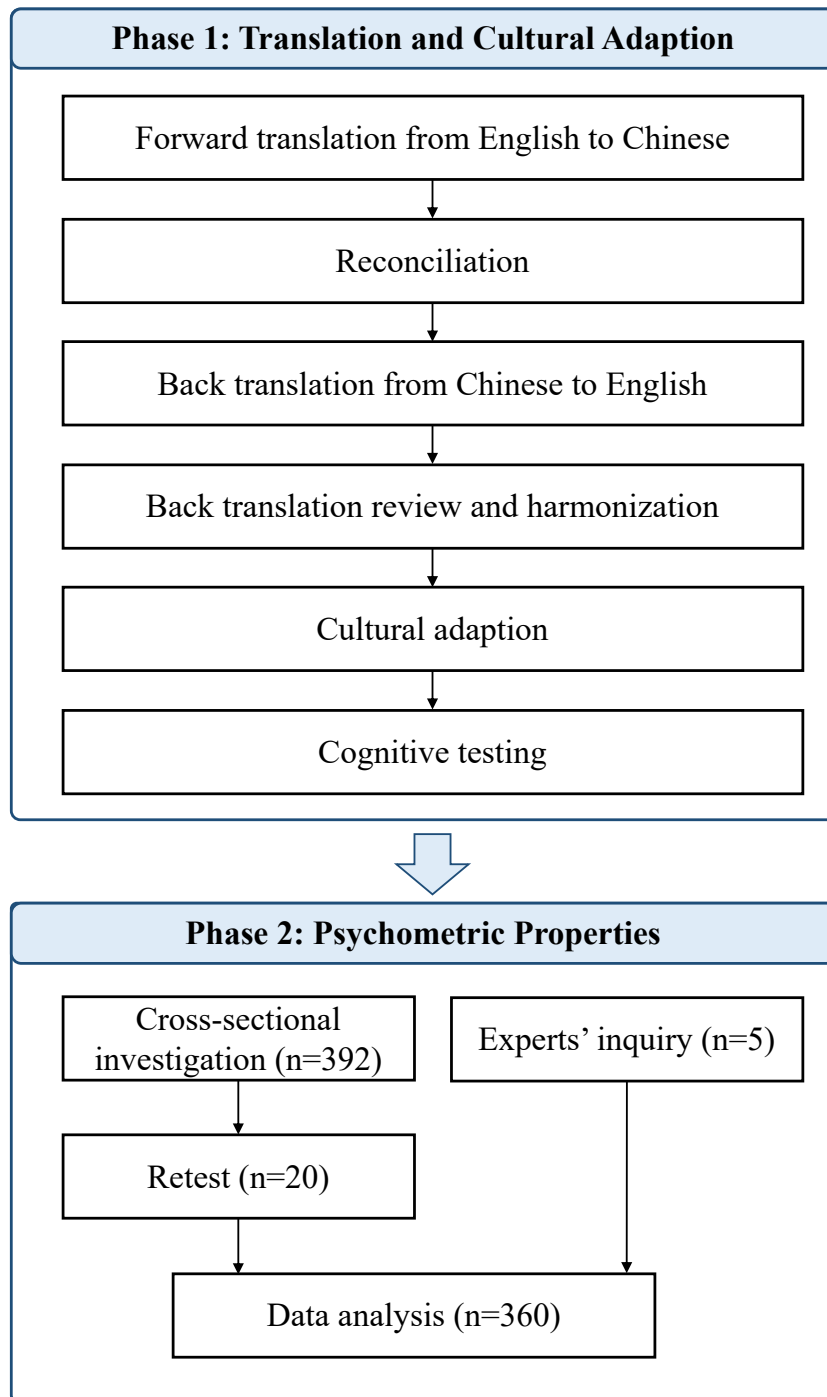


Figure 1 Flowchart of the translation and cross-cultural adaptation process of HCQ-P from the original English version.

Full-size DOI: [10.7717/peerj.19562/fig-1](https://doi.org/10.7717/peerj.19562/fig-1)

Step 2: Reconciliation

The two forward translations were compared and reconciled by the original translators and a third independent bilingual translator with expertise in medical terminology. Discrepancies were resolved through discussion, resulting in a consolidated forward translation (FT12).

Step 3: Back translation

Two professional translators, both native English speakers with advanced knowledge of Chinese and experience in healthcare-related translation, independently back-translated FT12 into English. These translators had not been exposed to the original HCQ-P. The back translation step yielded two versions (BT1 and BT2).

Step 4: Back translation review and harmonization

A review panel, including the research team and the translators involved, was convened to compare BT1 and BT2 with the original HCQ-P. Conceptual and semantic equivalence were assessed, and any discrepancies were clarified through consultation with the original HCQ-P developer. After harmonization, a pre-final version A of the Chinese HCQ-P was established.

Step 5: Cultural adaption

The pre-final version A underwent a cultural adaptation process. A panel of eight experts, including hospice care professionals and cross-cultural translation specialists, was invited to evaluate the semantic and cultural equivalence of the pre-final version A. Experts were selected based on the following criteria: (1) at least 5 years of experience in hospice care or cross-cultural research, (2) fluency in English and Chinese, and (3) willingness to participate. Feedback was collected through a four-point Likert scale (ranging from 1 = not applicable to 4 = totally applicable) and open-ended suggestions. Based on their feedback, modifications were made to form a pre-final version B.

Step 6: Cognitive testing

Pre-final version B was tested through cognitive interviews with 12 clinical professionals (six physicians and six nurses) who were actively engaged in hospice care. Participants completed the pre-final version B and were subsequently interviewed regarding their comprehension and perceptions of each item. Their feedback guided the refinement of the scale, leading to the finalized Chinese version of the HCQ-P.

Phase 2: Psychometric evaluation

The psychometric evaluation of the Chinese version of HCQ-P focused on its validity (content and construct validity) and reliability (internal consistency and test-retest reliability). Ethical approval was obtained from Peking University biomedical ethics committee (Approval No. IRB00001052-24038). This phase was divided into two components: expert consultations for content validity and a cross-sectional survey to evaluate other psychometric properties.

Experts' inquiry

Expert consultations were conducted to evaluate the content validity of the HCQ-P. Inclusion criteria for experts were as follows: (1) having extensive experience in hospice care practice and research; (2) having at least five-year professional experience; (3) willing to participate in the study. Finally, three experts were invited to assess the relevance of each item in the HCQ-P to the underlying measurement objectives. Evaluations were performed using a four-point Likert scale (1 = Not at all related to 4 = Very related). Feedback from the experts was used to calculate the item-level content validity index (I-CVI) and scale-level content validity index (S-CVI) for the HCQ-P.

Cross-sectional survey

Participants. Convenience sampling was used due to the practical limitations in accessing hospice patients, which is a commonly adopted method in palliative care research ([Etikan, Musa & Alkassim, 2016](#)). From December 2023 to June 2024, patients were recruited from hospice care wards and oncology wards. Inclusion criteria for participants were: (1) receiving hospice care services in outpatient or inpatient settings; (2) capable of subjective communication; (3) physically and cognitively able to complete the questionnaire independently or with assistance; and (4) provided informed consent and voluntarily agreed to participate. Informed consent was obtained in written form from all participants. Patients younger than 18 years or experiencing severe health changes within one week were excluded from the study.

Sample size. According to the Kendall sample estimation method, the sample size should be 5–10 times the number of questionnaire items ([Shoukri, Asyali & Donner, 2004](#)). Given that the HCQ-P has 49 items, the minimum sample size was set at 245 participants. To account for potential non-responses, the sample size was increased by 20%, at least 307 participants were required for confirmatory factor analysis (CFA) to ensure adequate statistical power. The 20% adjustment is a widely recognized practice in survey-based research to account for non-response bias and enhance the reliability of statistical analysis ([Krejcie & Morgan, 1970](#); [Shoukri, Asyali & Donner, 2004](#)). While sensitivity analyses were not conducted in this study due to time and resource constraints, future research could incorporate such analyses to further evaluate the robustness of sample size assumptions.

Data collection. The pre-survey phase took place from December 2023 to January 2024, followed by the formal survey from February 2024 to June 2024. After obtaining informed consent, research team members distributed questionnaires with standardized instructions through the Questionnaire Star by sending the website link or QR code to the potentially eligible participants. The questionnaire consisted of three sections: (1) instructions and informed consent to explain the research's purpose, principles of anonymity, and voluntary participation; (2) demographic characteristics including gender, age, education level, marital status, primary diagnosis, treatment history, and experience with hospice comfort services; (3) Chinese version of the HCQ-P. Finally, a total of 392 questionnaires were distributed, and 360 valid responses were received, yielding a response rate of 91.8%. For test-retest reliability, we sent HCQ-P again after a three-week interval, and 20 valid

questionnaires were received. The data that support the findings of this study are available from the supplemental files.

Data analysis

Demographic characteristics were presented by frequencies and percentages. The scores of the HCQ-P were presented with means and standard deviations. All analyses were conducted using the SPSS 27.0 and Amos 24.0 software.

Floor and ceiling effects. Floor and ceiling effects were evaluated by calculating the minimum or maximum scores on the HCQ-P. Floor or ceiling effects were considered absent if less than 15% of participants achieved the lowest or highest scores ([Terwee et al., 2007](#)).

Internal consistency reliability. Internal consistency reliability was evaluated by calculating Cronbach's α coefficients for each dimension and the total scale. Cronbach's α coefficients ≥ 0.70 were considered satisfactory ([Mokkink et al., 2016](#)). Additionally, item-total correlation coefficients were calculated to measure the relationship between individual items and the total score. Items with a correlation coefficient < 0.20 were considered for deletion ([Zhang, Ge & Rask, 2019](#)).

Test-retest reliability. To assess the stability of the questionnaire over time, the intraclass correlation coefficient (ICC) was calculated using Spearman's Rho correlation analysis. An ICC value ≥ 0.70 indicated good test-retest reliability, while 0.60 was acceptable ([De Vet et al., 2006](#); [Jöreskog, 1971](#)).

Content validity. The content validity index (CVI) was assessed at both the item level (I-CVI) and scale level (S-CVI) based on expert ratings. I-CVI was calculated as the proportion of experts rating each item as 3 (related) or 4 (very related) on a four-point Likert scale. The S-CVI was computed as the average of all I-CVIs. Content validity was considered satisfactory if I-CVI ≥ 0.78 and S-CVI ≥ 0.80 ([Lynn, 1986](#)).

Construct validity. Construct validity was evaluated using confirmatory factor analysis (CFA) to test the original four-factor structure of the HCQ-P. Model fit was assessed using the following indices: $\chi^2/\text{degrees of freedom ratio}$ ($\chi^2/\text{df} < 3.00$ indicated good, while < 0.5 was acceptable), root mean square error of approximation (RMSEA < 0.08), goodness of fit index (GFI > 0.90), Tucker-Lewis index (TLI > 0.90), and comparative fit index (CFI > 0.90) ([Worthington & Whittaker, 2006](#)). Item factor loadings were also examined, with a cutoff of 0.40 used to retain items in the model ([McNeish, An & Hancock, 2018](#)).

RESULTS

Phase 1: Translation and cross-cultural adaptation process

Translation discrepancies primarily emerged during the back translation review and harmonization (Step 4) and the cultural adaptation (Step 5). The expert panel suggested changes to enhance clarity and cultural relevance. The first issue is that the expression of

physical discomfort varied significantly across different diseases, prompting a refinement of terminologies used to describe bodily sensations in the Chinese context. After discussion in the harmonization meeting and communication with the developer, we modified item 5 from 'I feel bloated' to 'I feel my body swelling'. Additionally, the distinction between environmental, psychospiritual and physical comfort became crucial as certain items translated directly could lead to ambiguity. For instance, item 32 was changed from 'This chair (bed) makes me hurt' to 'This chair (bed) makes me uncomfortable', a more specific expression to reflect environmental discomfort caused by furniture, and item 38 from 'I feel out of place here' to 'I'm not comfortable here' to better convey the sense of environmental discomfort. Finally, 12 participants reviewed the Chinese HCQ-P for clarity and relevance. All confirmed the items were well-articulated and understandable, necessitating no revisions. The items from both the original English and final Chinese versions are detailed in [Table 1](#), demonstrating effective adaptation for Chinese hospice care contexts.

Phase 2: Psychometric evaluation

Participant characteristics

A total of 392 questionnaires were collected from hospice care wards and oncology wards. After excluding ineligible and obviously invalid responses, 360 valid questionnaires were included in the analysis, resulting in an effective response rate of 91.8%. There were no missing data, as each item in the electronic questionnaire was mandatory. Detailed demographic characteristics of the participants are provided in [Table 2](#), while the HCQ-P item scores are presented in [Table 3](#).

Floor and ceiling effects

In the validation of the HCQ-P, with a scoring range from 49 to 294, the observed highest and lowest scores were 280 and 144, respectively, each recorded by two participants (0.56%). Given that floor and ceiling effects are significant if more than 15% of participants score at these extremes, the minimal occurrence indicated no floor or ceiling effects in HCQ-P.

Internal consistency reliability

The overall reliability of the HCQ-P was reflected in a high Cronbach's α of 0.94. When analyzing the subscales, the reliability coefficients varied, with the physical Comfort Scale scoring the highest at 0.841 and the Sociocultural Comfort Scale the lowest at 0.772 (see [Table 4](#)). Notably, all item-total correlation coefficients were statistically significant ($p < 0.001$) and the absolute value were greater than 0.2 except for item HCQ-P26, I would like to see my doctor more often, which is part of the Sociocultural Comfort Scale. Furthermore, prior to its exclusion, the Cronbach's α coefficient of Sociocultural Comfort would increase. Therefore, item 26 was excluded (see [Table 3](#)).

Test-retest reliability

The Intraclass Correlation Coefficient (ICC) for the HCQ-P showed excellent stability with an overall ICC of 0.93. The ICCs for individual dimensions ranged from 0.772 in Sociocultural Comfort to 0.812 in physical Comfort, confirming the Chinese version of

Table 1 The items of the HCQ-P in both English version and Chinese version.

Items	English version	Chinese version
HCQ-P1	My body is relaxed right now	我的身体现在很放松
HCQ-P2	My breathing is difficult	我呼吸困难
HCQ-P3	I have enough privacy	我有足够的隐私
HCQ-P4	There are those I can depend on when I need help	当我需要帮助时，有人可以依靠
HCQ-P5	I feel bloated	我感到身体肿胀
HCQ-P6	I worry about my family	我担心我的家庭
HCQ-P7	My beliefs give me peace of mind	我的信仰使我内心平和
HCQ-P8	My nurse(s) give me hope	护士给了我希望
HCQ-P9	My life is worthwhile right now	我的生命是有价值的
HCQ-P10	I know that I am loved	我知道有人爱我
HCQ-P11	These surroundings are pleasant	周围的环境令人愉悦
HCQ-P12	I have difficulty resting	我难以放松
HCQ-P13	No one understands me	没有人理解我
HCQ-P14	My pain is difficult to endure	我的疼痛难以忍受
HCQ-P15	I feel peaceful	我感到平静
HCQ-P16	I sleep soundly	我睡得很安稳
HCQ-P17	I feel guilty	我感到愧疚
HCQ-P18	I like being here	我喜欢在这里
HCQ-P19	I am nauseated	我感到恶心
HCQ-P20	I am able to communicate with my loved ones	我能够与我爱的人交流
HCQ-P21	This room makes me feel scared	我能够与我爱的人交流
HCQ-P22	I am afraid of what is next	这个房间让我感到害怕
HCQ-P23	I have special person(s) who make(s) me feel cared for	我害怕接下来会发生的事情
HCQ-P24	I have experienced changes which make me feel uneasy	生活中有特别关心我的人
HCQ-P25	I like my room to be quiet	我经历过让我感到不安的变化
HCQ-P26	I would like to see my doctor more often	我喜欢我的房间是安静的
HCQ-P27	My mouth and skin feel very dry	我想更频繁地见到医生
HCQ-P28	I'm okay with my personal relationships	我感到嘴巴和皮肤非常干燥
HCQ-P29	I can raise above my pain	我可以克服疼痛
HCQ-P30	The mood around here is depressing	这里气氛压抑
HCQ-P31	I am at ease physically	我现在身体是放松的
HCQ-P32	This chair makes me hurt	我坐的椅子让我不舒服
HCQ-P33	This view inspires me	这里的景象激励着我
HCQ-P34	I think about my discomforts constantly	我总是在想我的不舒适
HCQ-P35	I feel confident spiritually	我在精神上感到自信
HCQ-P36	I feel enough to do some things for myself	我认为自己能够为自己做一些事情
HCQ-P37	My friends remembers me with their cards and phone calls	我的朋友惦记着我，给我寄卡片、打电话
HCQ-P38	I feel out of place here	我在这里感到不自在
HCQ-P39	I need to be better informed about my condition	我需要更好地了解我的情况

(continued on next page)

Table 1 (continued)

Items	English version	Chinese version
HCQ-P40	I feel helpless	我感到无助
HCQ-P41	My god is helping me	老天在帮助我
HCQ-P42	This room smells fresh	这个房间空气清新
HCQ-P43	I feel lonely	我感到孤独
HCQ-P44	I am able to tell people what I need	我能够告诉别人我的需求
HCQ-P45	I am depressed	我感到抑郁
HCQ-P46	I have found meaning in my life	我找到了人生的意义
HCQ-P47	In retrospect, I've had a good life	回顾过去，我这辈子很不错
HCQ-P48	My loved ones' state of mind makes me feel sad	我所爱的人的心态让我感到悲伤
HCQ-P49	The temperature in this room is fine	这个房间的温度适宜

the HCQ-P’s reliable measurement of comfort over time. Detailed results are presented in Table 4.

Content validity

In terms of content validity, all experts unanimously agreed that every item of the HCQ-P was relevant to the measurement objectives. Consequently, both the I-CVI and the S-CVI achieved the maximum value of 1, indicating perfect agreement among the experts regarding the questionnaire’s content validity.

Construct validity

Figure 2 presented the CFA model for the HCQ-P, illustrating the factor loadings for each item. After removing item 26 (I would like to see my doctor more often), item 3 (I have enough privacy), item 7 (My beliefs give me peace of mind), item 29 (I can raise above my pain) and item 41 (My God is helping me), the model fit indices ($\chi^2 = 3,256.394$, $df = 884$, $\chi^2/df = 3.684 < 5$) confirmed the validity of the four-factor model, ensuring its suitability for use in Chinese hospice care contexts.

DISCUSSION

Hospice care, pioneered by Saunders (1978), aims to ensure patients spend their final days in comfort, peace, and dignity while providing psychological and spiritual support to their families and caregivers. This concept has gained widespread acceptance globally, especially in developed countries (Finkelstein et al., 2022). In developing countries like China, increased awareness about quality of life has significantly heightened interest in hospice care, although research in this field is still emerging (Zhong et al., 2024). The HCQ-P has been validated as an effective and reliable tool for assessing comfort in terminally ill patients (Novak et al., 2001; Kolcaba et al., 2004; Lorente, Losilla & Vives, 2018). Thus, the adaptation and validation of the Chinese version of the HCQ-P are crucial steps towards meeting the demand for culturally adapted hospice care tools in China.

To address the need for culturally appropriate hospice care assessment instruments, we translated and adapted the HCQ-P into Chinese and rigorously evaluated its psychometric properties. During the translation process, some ambiguous item expressions in the Chinese

Table 2 Demographic characteristics of the sample.

Characteristics	<i>n</i>	%
Gender		
Male	186	48
Female	174	52
Age (years)		
19–45	32	9
46–60	107	30
61–75	187	52
76–102	34	9
Educational level		
Junior high school or below	103	29
High/Vocational high/Technical secondary school	121	34
Associate degree/Bachelor's degree	118	33
Master's degree or above	18	5
Marital status		
Married	279	78
Single	18	5
Divorced	31	9
Widowed	32	9
Medical expenses		
Basic medical insurance	190	53
Public medical care	93	26
Cooperative medical care	58	16
Out-of-pocket	19	5
Disease diagnosis		
Lung cancer	91	25
Stomach cancer	16	4
Colon cancer	54	15
Liver cancer	7	2
Esophageal cancer	20	6
Pancreatic cancer	8	2
Lymphoma	14	4
Ovarian cancer	22	6
Breast cancer	18	5
Nasopharyngeal cancer	49	14
Others	61	17
Duration of disease		
≤1 year	157	44
1–5 years	155	43
>5 years	48	13

(continued on next page)

Table 2 (continued)

Characteristics	<i>n</i>	%
Surgical history		
No surgery history	158	44
Surgery history	202	56
Chemotherapy history		
No chemotherapy history	75	21
Chemotherapy history	285	79
Radiotherapy history		
No radiotherapy history	246	68
Radiotherapy history	114	32
Life education		
No life education received	237	66
Life education received	123	34
Type of previous occupation		
Manager	55	15
Technician	95	26
Staff	117	33
Farmer	57	16
Unemployed	36	10

context were identified and revised after consultation with experts. These adjustments ensured that the wording accurately conveyed the intended meaning and aligned with cultural and linguistic nuances, thereby enhancing the clarity and applicability of the HCQ-P in Chinese hospice care settings. The findings confirm the HCQ-P we translated exhibits sufficient validity (content validity and construct validity), satisfactory reliability (internal consistency and test-retest reliability), and no floor or ceiling effects.

The high internal consistency of the Chinese version of the HCQ-P was evidenced by an overall Cronbach's α of 0.94, with Cronbach's α values for all four comfort dimensions exceeding 0.7. The test-retest reliability, reflected by an overall ICC of 0.93, further confirmed the questionnaire's stability for repeated assessments. Notably, item 26 ('I would like to see my doctor more often') was removed due to its item-total correlation coefficients failing to reach statistical significance, which subsequently increased the reliability of the Sociocultural Comfort dimension from 0.772 to 0.817. This may be due to the lack of participants in the sample from community health service centers actively involved in hospice care. Above all, these findings align with the strong reliability demonstrated in the original English version (Novak *et al.*, 2001) and the cross-cultural adaption, like Portuguese adaptation (Pinto *et al.*, 2016) and South Korea (Kim & Kwon, 2007), supporting the robustness of the HCQ-P across different cultural contexts.

Additionally, due to cultural differences between Eastern and Western contexts, the Psychospiritual Comfort does not apply particularly well in CFA. Specifically, item 3 (I have enough privacy), item 7 ('My beliefs give me peace of mind'), item 29 ('I can raise above my pain') and item 41 ('My God is helping me') had lower factor loadings. Specifically, the physiological dimension of item 29 ('I can raise above my pain'), in the

Table 3 Mean, standard deviation and ICC of items ($n = 360$).

HCQ-P items	Mean	SD	Item-total
Physiological comfort			
HCQ-P1	4.96	1.400	0.590**
HCQ-P2	4.62	1.823	0.593**
HCQ-P5	4.86	1.636	0.737**
HCQ-P12	4.54	1.785	0.769**
HCQ-P14	4.49	1.773	0.819**
HCQ-P16	4.84	1.530	0.537**
HCQ-P19	4.72	1.679	0.784**
HCQ-P27	4.12	1.841	0.664**
HCQ-P29	4.20	1.790	0.204**
HCQ-P31	4.31	1.618	0.434**
HCQ-P34	4.53	1.650	0.720**
Psychospiritual comfort			
HCQ-P3	4.56	1.658	0.384**
HCQ-P7	3.87	2.113	0.466**
HCQ-P9	5.31	1.248	0.615**
HCQ-P15	4.92	1.489	0.609**
HCQ-P17	5.03	1.486	0.612**
HCQ-P22	4.42	1.839	0.739**
HCQ-P35	5.03	1.288	0.641**
HCQ-P36	5.15	1.286	0.534**
HCQ-P40	4.65	1.594	0.742**
HCQ-P41	3.78	1.884	0.375**
HCQ-P43	4.81	1.541	0.669**
HCQ-P45	4.93	1.471	0.667**
HCQ-P46	4.85	1.395	0.615**
Sociocultural comfort			
HCQ-P4	5.35	1.119	0.668**
HCQ-P6	3.41	1.960	0.272**
HCQ-P8	5.19	1.183	0.663**
HCQ-P10	5.60	0.862	0.699**
HCQ-P13	4.69	1.704	0.524**
HCQ-P20	5.35	1.129	0.651**
HCQ-P23	5.27	1.263	0.632**
HCQ-P24	3.79	2.026	0.430**
HCQ-P26	2.62	1.676	-0.027
HCQ-P28	5.18	1.168	0.638**
HCQ-P37	5.16	1.214	0.691**
HCQ-P39	2.01	1.319	-0.216**
HCQ-P44	5.21	1.130	0.695**
HCQ-P47	5.15	1.284	0.673**

(continued on next page)

Table 3 (continued)

HCQ-P items	Mean	SD	Item-total
HCQ-P48	4.83	1.636	0.525**
Environmental comfort			
HCQ-P11	5.01	1.438	0.615**
HCQ-P18	3.91	1.890	0.601**
HCQ-P21	4.91	1.636	0.643**
HCQ-P25	1.79	1.316	−0.201**
HCQ-P30	4.66	1.561	0.780**
HCQ-P32	4.45	1.661	0.731**
HCQ-P33	4.54	1.609	0.767**
HCQ-P38	4.60	1.622	0.796**
HCQ-P42	4.88	1.340	0.679**
HCQ-P49	5.05	1.239	0.647**

Notes.

**P < 0.01.

Item-total, Item-total correlation coefficients; HCQ-P, Hospice Comfort Questionnaire-Patients; SD, standard deviation. Item-total correlation coefficients using Pearson's correlation test; Items that are deleted are displayed in italic.

Table 4 The scores and reliability (n = 360).

The HCQ-P	Mean	SD	Cronbach's α	ICC
Physical comfort	50.20	11.55	0.84	0.812***
Psychospiritual comfort	61.31	11.90	0.84	0.936***
Sociocultural comfort	66.80	10.01	0.77	0.926***
Environmental comfort	43.79	9.51	0.82	0.949***
The HCQ-P	224.12	38.421	0.94	0.930***

Notes.

***P < 0.0001.

HCQ-P, Hospice Comfort Questionnaire-Patients; SD, standard deviation; ICC, intra-class correlation coefficient.

Chinese context, patients may be reluctant to express pain because of cultural habits, especially if they do not want to burden their family members. Therefore, deleting item 29 can reduce the influence of cultural and psychospiritual factors. Item 3 ('I have enough privacy'), item 7 ('My beliefs give me peace of mind') and item 41 ('My God is helping me') in psychospiritual comfort exhibit relatively low factor loadings. This may be due to cultural differences between Eastern and Western contexts. In Western cultures, privacy is often considered a fundamental aspect of comfort, whereas in some Eastern cultures, the concept of privacy might be less emphasized in the same context (Whitman, 2003). Similarly, God may resonate differently across cultures, particularly when considering the varying religious beliefs and spiritual practices prevalent in different cultural settings (Wikan, 1992). Despite this, the overall structural and the other content validity of the HCQ-P was supported by unanimous expert approval during the content validity assessment and significant factor loadings in the CFA after item adjustments. These outcomes indicate that the HCQ-P is not only statistically robust but also resonates well with the cultural and clinical contexts of Chinese hospice care.

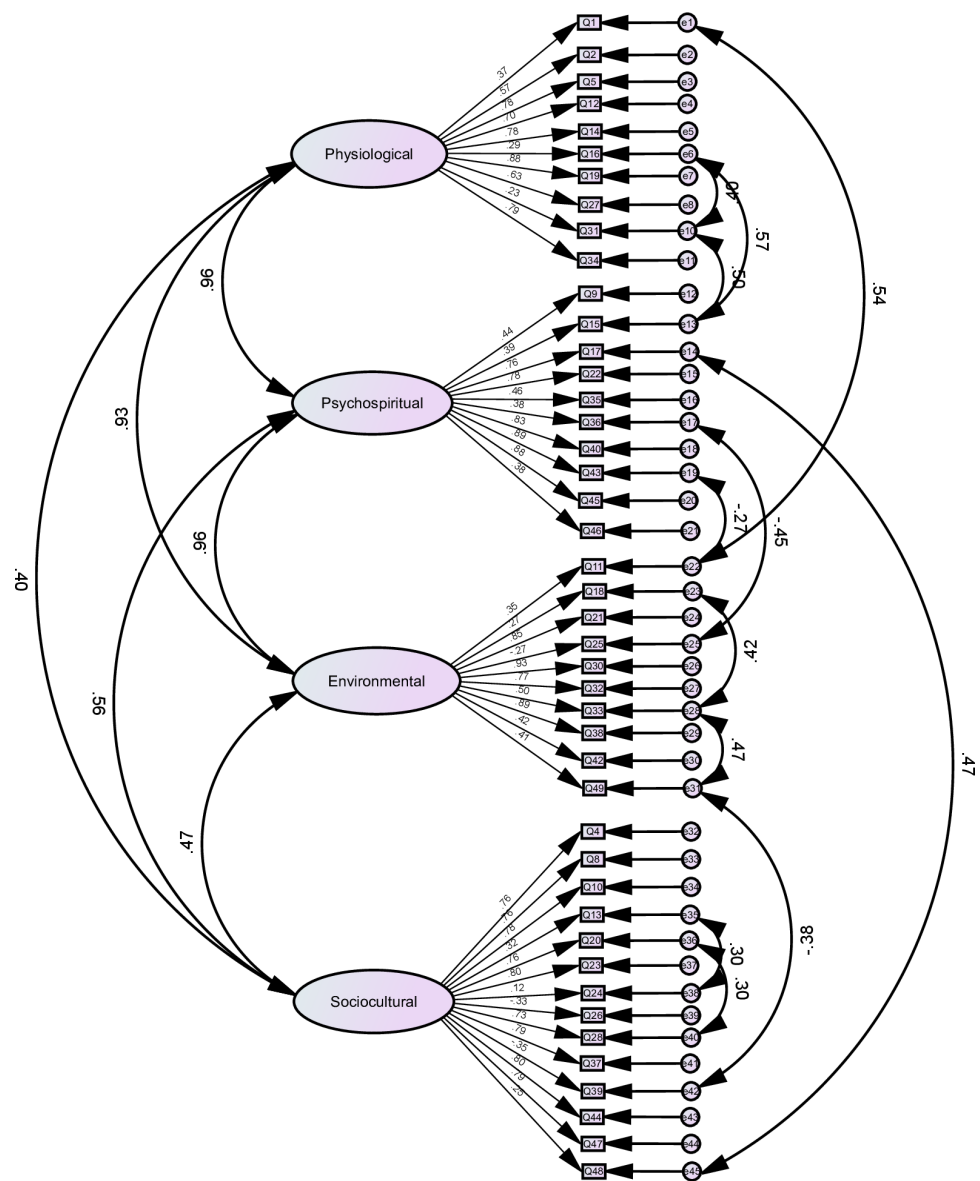


Figure 2 Confirmatory factor analysis.

[Full-size !\[\]\(feabb98897b440bc8695a03336a6e2df_img.jpg\) DOI: 10.7717/peerj.19562/fig-2](https://doi.org/10.7717/peerj.19562/fig-2)

In summary, this research's strengths lie in its rigorous methodology and strict adherence to international guidelines during the translation and cross-cultural adaptation of the HCQ-P, ensuring robustness and scientific validity. However, it does face limitations. First, the sample size was constrained by time and financial limitations, which may affect generalizability. Additionally, the reliance on self-reported data introduces bias, and the sample, largely composed of hospitalized patients, may not represent other hospice populations, such as home-based care recipients. To address these issues, future studies should involve larger, more diverse samples using random sampling across various healthcare settings, including home-based hospice care, to improve external validity.

Furthermore, while some items were removed due to low factor loadings, these could still be relevant for certain patients. Future research should explore alternative wordings through qualitative interviews to refine the scale for cultural relevance. Lastly, in the future, the HCQ-P's performance would be evaluated in different disease groups, and comparisons with tools like the General Comfort Questionnaire (GCQ) could help identify strengths and areas for improvement.

CONCLUSION

We have translated and culturally adapted the Hospice Comfort Questionnaire-Patients (HCQ-P) into Chinese. Psychometric assessments confirm that the Chinese version is both reliable and valid for evaluating hospice care practices in China. Given the constrained sample size of this initial study, further research with a larger and more diverse group of hospice care patients is recommended to enhance the robustness of the findings. Overall, this research equips Chinese healthcare providers and administrators with a validated instrument to assess and address patients' comfort in hospice care, potentially facilitating improvements in service delivery. Additionally, the HCQ-P scores can be utilized to gauge the effectiveness of hospice care training programs or policy implementations, contributing to the broader development of hospice care in China.

ADDITIONAL INFORMATION AND DECLARATIONS

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Competing Interests

The authors declare there are no competing interests.

Author Contributions

- Nana Xu conceived and designed the experiments, performed the experiments, analyzed the data, prepared figures and/or tables, authored or reviewed drafts of the article, and approved the final draft.
- Xu Yan conceived and designed the experiments, performed the experiments, authored or reviewed drafts of the article, and approved the final draft.
- Xiaohong Ou conceived and designed the experiments, performed the experiments, authored or reviewed drafts of the article, and approved the final draft.
- Jun Ren conceived and designed the experiments, performed the experiments, authored or reviewed drafts of the article, and approved the final draft.
- Qiaoqin Wan conceived and designed the experiments, performed the experiments, analyzed the data, prepared figures and/or tables, authored or reviewed drafts of the article, and approved the final draft.

Human Ethics

The following information was supplied relating to ethical approvals (i.e., approving body and any reference numbers):

This study was obtained the ethical approval from the Institutional Review Board of Peking University (Approval No. IRB00001052-24038).

Data Availability

The following information was supplied regarding data availability:

The raw measurements of patients are available in the [Supplementary Files](#). These participants were used for cross-sectional survey in psychometric evaluation.

Supplemental Information

Supplemental information for this article can be found online at <http://dx.doi.org/10.7717/peerj.19562#supplemental-information>.

REFERENCES

- Ambuel B, Hamlett KW, Marx CM, Blumer JL. 1992. Assessing distress in pediatric intensive care environments: the COMFORT scale. *Journal of Pediatric Psychology* 17(1):95–109 DOI 10.1093/jpepsy/17.1.95.
- Bai J, Hsu L, Tang Y, Van Dijk M. 2012. Validation of the COMFORT behavior scale and the FLACC scale for pain assessment in Chinese children after cardiac surgery. *Pain Management Nursing* 13(1):18–26 DOI 10.1016/j.pmn.2010.07.002.
- Bian F. 2022. Application of nasal high-flow oxygen therapy and non-invasive ventilation in the treatment of acute exacerbation of chronic obstructive pulmonary disease with type II respiratory failure in the elderly. *Chinese Journal of Geriatrics* 42(21):5223–5226.
- Bozdemir H, Usta E, Yaban ZS, Aygin D. 2022. Evaluation of the factors affecting the comfort of patients who undergo surgery for breast cancer. *International Journal of Caring Sciences* 15(1):522–529.
- Carnevale FA, Razack S. 2002. An item analysis of the COMFORT scale in a pediatric intensive care unit. *Pediatric Critical Care Medicine* 3(2):177–180 DOI 10.1097/00130478-200204000-00016.
- Cinar Yucel Ş, Goke Arslan G, Ergin E, Kuguoglu S. 2019. Psychometric characteristics of the Turkish version of the nurse comfort questionnaire. *Journal of Religion and Health* 58:1803–1816 DOI 10.1007/s10943-019-00852-4.
- De Vet HC, Terwee CB, Knol DL, Bouter LM. 2006. When to use agreement versus reliability measures. *Journal of Clinical Epidemiology* 59(10):1033–1039 DOI 10.1016/j.jclinepi.2005.10.015.
- Etikan I, Musa SA, Alkassim RS. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics* 5(1):1–4 DOI 10.11648/j.ajtas.20160501.11.
- Finkelstein EA, Bhadelia A, Goh C, Baid D, Singh R, Bhatnagar S, Connor SR. 2022. Cross country comparison of expert assessments of the quality of death and dying 2021. *Journal of Pain and Symptom Management* 63(4):e419–e429 DOI 10.1016/j.jpainsymman.2021.12.015.

- Freitas KS, Menezes IG, Mussi FC. 2015. Validación de la escala de confort para familiares de personas en estado crítico de salud. *Revista Latino-Americana de Enfermagem* 23:660–668 DOI 10.1590/0104-1169.0180.2601.
- Góis JA, Freitas KS, Kolcaba K, Mussi FC. 2018. Cross-cultural adaptation of the general comfort questionnaire to brazilian patients with myocardial infarction. *Revista Brasileira de Enfermagem* 71:2998–3005 DOI 10.1590/0034-7167-2017-0557.
- Hazwani T, Al Ahmady A, Kazzaz Y, Al Smari A, Al Enizy S, Alali H. 2022. Implementation of a sedation protocol: a quality improvement project to enhance sedation management in the paediatric intensive care unit. *BMJ Open Quality* 11(1):e001501 DOI 10.1136/bmjopen-2021-001501.
- Hu L, Xu Y, Xu Y. 2023. Application value of self-management manual combined with case management superiority model in postoperative management of nasopharyngeal carcinoma after radiotherapy. *American Journal of Translational Research* 15(7):4951–4962.
- Isaacson MJ, Minton ME. 2018. Comfort with communication in palliative and end of life care (C-COPE). College of Nursing Faculty Publications 65. Available at https://openprairie.sdstate.edu/con_pubs/65.
- Ista E, Van Dijk M, Tibboel D, De Hoog M. 2005. Assessment of sedation levels in pediatric intensive care patients can be improved by using the COMFORT “behavior” scale. *Pediatric Critical Care Medicine* 6(1):58–63 DOI 10.1097/01.PCC.0000149318.40279.1A.
- Ji X, Bai J, Jia Y, Wang S, Liang L. 2023. Chinese translation and psychometric validation of the hospice comfort communication scale. *Journal of Nursing Science* 38(14):76–80 DOI 10.3870/j.issn.1001-4152.2023.14.076.
- Jöreskog KG. 1971. Simultaneous factor analysis in several populations. *Psychometrika* 36(4):409–426 DOI 10.1007/BF02291366.
- Kiely DK, Volicer L, Teno J, Jones RN, Prigerson HG, Mitchell SL. 2006. The validity and reliability of scales for the evaluation of end-of-life care in advanced dementia. *Alzheimer Disease & Associated Disorders* 20(3):176–181 DOI 10.1097/00002093-200607000-00009.
- Kim K-S, Kwon S-H. 2007. Comfort and quality of life of cancer patients. *Asian Nursing Research* 1(2):125–135 DOI 10.1016/S1976-1317(08)60015-8.
- Kolcaba K, Dowd T, Steiner R, Mitzel A. 2004. Efficacy of hand massage for enhancing the comfort of hospice patients. *Journal of Hospice & Palliative Nursing* 6(2):91–102 DOI 10.1097/00129191-200404000-00012.
- Kolcaba KY. 1992. Holistic comfort: operationalizing the construct as a nurse-sensitive outcome. *Advances in Nursing Science* 15(1):1–10 DOI 10.1097/00012272-199209000-00003.
- Koopman AA, Blokpoel RG, Van Eykern LA, De Jongh FH, Burgerhof JG, Kneyber MC. 2018. Transcutaneous electromyographic respiratory muscle recordings to quantify patient–ventilator interaction in mechanically ventilated children. *Annals of Intensive Care* 8:1–9 DOI 10.1186/s13613-017-0346-6.

- Krejcie RV, Morgan DW. 1970. Determining sample size for research activities. *Educational and Psychological Measurement* 30(3):607–610 DOI 10.1177/001316447003000308.
- Li L, Liu X, Herr K. 2007. Postoperative pain intensity assessment: a comparison of four scales in Chinese adults. *Pain Medicine* 8(3):223–234 DOI 10.1111/j.1526-4637.2007.00296.x.
- Liu Z, Ge X. 2019. The sedation practices of paediatric intensive care unit nurses and the influencing factors in China. *Nursing in Critical Care* 24(5):306–312 DOI 10.1111/nicc.12426.
- Lorente S, Losilla J-M, Vives J. 2018. Instruments to assess patient comfort during hospitalization: a psychometric review. *Journal of Advanced Nursing* 74(5):1001–1015 DOI 10.1111/jan.13495.
- Lynn MR. 1986. Determination and quantification of content validity. *Nursing Research* 35(6):382–386 DOI 10.1097/00006199-198611000-00017.
- McNeish D, An J, Hancock GR. 2018. The thorny relation between measurement quality and fit index cutoffs in latent variable models. *Journal of Personality Assessment* 100(1):43–52 DOI 10.1080/00223891.2017.1281286.
- Mei Y, Chang H, Li Y, Song Y, Li S, Wang L. 2021. Construction and application of early mobilization program for colorectal cancer patients after radical surgery under the concept of enhanced recovery after surgery. *Nursing Research* 35(18):3197–3204 DOI 10.12102/j.issn.1009-6493.2021.18.001.
- Mokkink LB, Prinsen CA, Bouter LM, Vet HCD, Terwee CB. 2016. The consensus-based standards for the selection of health measurement instruments (COSMIN) and how to select an outcome measurement instrument. *Brazilian Journal of Physical Therapy* 20(2):105–113 DOI 10.1590/bjpt-rbf.2014.0143.
- Naber D, Moritz S, Lambert M, Rajonk F, Holzbach R, Mass R, Andresen B, Frank P, Rüdiger H, Reinhard M, Burghard A. 2001. Improvement of schizophrenic patients' subjective well-being under atypical antipsychotic drugs. *Schizophrenia Research* 50(1–2):79–88 DOI 10.1016/S0920-9964(00)00166-3.
- Novak B, Kolcaba K, Steiner R, Dowd T. 2001. Measuring comfort in caregivers and patients during late end-of-life care. *American Journal of Hospice and Palliative Medicine*® 18(3):170–180 DOI 10.1177/104990910101800308.
- Pinto SMO, Berenguer SMAC, Martins JCA, Kolcaba K. 2016. Cultural adaptation and validation of the Portuguese end of life spiritual comfort questionnaire in palliative care patients. *Porto Biomedical Journal* 1(4):147–152 DOI 10.1016/j.pbj.2016.08.003.
- Saunders C. 1978. Hospice care. *The American Journal of Medicine* 65(5):726–728 DOI 10.1016/0002-9343(78)90789-1.
- Shoukri MM, Asyali M, Donner A. 2004. Sample size requirements for the design of reliability study: review and new results. *Statistical Methods in Medical Research* 13(4):251–271 DOI 10.1191/0962280204sm365ra.

- Styes AA, Isaacson MJ. 2021. Improving rural emergency nurses comfort during palliative and end-of-life communication. *Online Journal of Rural Nursing and Health Care* 21(1):100–117 DOI 10.14574/ojrnhc.v21i1.647.
- Terwee CB, Bot SD, De Boer MR, Van der Windt DA, Knol DL, Dekker J, Bouter LM, De Vet HC. 2007. Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology* 60(1):34–42 DOI 10.1016/j.jclinepi.2006.03.012.
- Trotte LAC, Caldas CP. 2015. Palliative care in HF: the comfort as an outcome of nursing care. *Heart & Lung* 44(6):547 DOI 10.1016/j.hrtlng.2015.10.006.
- Vicdan AK. 2020. The effect of training given to hemodialysis patients according to the comfort theory. *Clinical Nurse Specialist* 34(1):30–37 DOI 10.1097/NUR.0000000000000495.
- Volicer L, Hurley AC, Blasi ZV. 2001. Scales for evaluation of end-of-life care in dementia. *Alzheimer Disease & Associated Disorders* 15(4):194–200 DOI 10.1097/00002093-200110000-00005.
- Whitman JQ. 2003. The two western cultures of privacy: dignity versus liberty. *Yale Law Journal* 113:1151–1221 DOI 10.2139/ssrn.476041.
- Wikan U. 1992. Beyond the words: the power of resonance. *American Ethnologist* 19(3):460–482 DOI 10.1525/ae.1992.19.3.02a00030.
- Williams A, Lester L, Bulsara C, Petterson A, Bennett K, Allen E, Joske D. 2017. Patient evaluation of emotional comfort experienced (PEECE): developing and testing a measurement instrument. *BMJ Open* 7(1):e012999 DOI 10.1136/bmjopen-2016-012999.
- Wittenberg E, Alabere RO, Beltran E, Goldsmith JV, Moledina S. 2022. Sharing comfort communication training with healthcare professionals in Nairobi, Kenya: a pilot webinar series. *American Journal of Hospice and Palliative Medicine*® 39(4):421–426 DOI 10.1177/10499091211026673.
- Woodforde J, Merskey H. 1972. Some relationships between subjective measures of pain. *Journal of Psychosomatic Research* 16(3):173–178 DOI 10.1016/0022-3999(72)90041-4.
- Worthington RL, Whittaker TA. 2006. Scale development research: a content analysis and recommendations for best practices. *The Counseling Psychologist* 34(6):806–838 DOI 10.1177/0011000006288127.
- Yeh JC, Newman J, Main R, Hunt LJ. 2021. Improving end-of-life care for persons living with dementia: bereaved caregivers' observations and recommendations. *Journal of Pain and Symptom Management* 62(3):579–586 DOI 10.1016/j.jpainsymman.2021.01.133.
- Zhang M, Ge L, Rask M. 2019. Cross-cultural adaptation and psychometric testing of the verbal and social interaction questionnaire: a cross-sectional study among nursing students in China. *Journal of Clinical Nursing* 28(11–12):2181–2196 DOI 10.1111/jocn.14811.

Zhao X, Huang R, Jin L. 2020. Effect of bakri balloon pressure on comfort and pain in postpartum hemorrhage patients. *Nursing Research* **34**(18):3333–3335
DOI [10.12102/j.issn.1009-6493.2020.18.028](https://doi.org/10.12102/j.issn.1009-6493.2020.18.028).

Zhong J, Zhang W, Xu R, Wang H, Zhao J, Huang Y, Chen Y, Chen X, Chen J, Zhang Q, Zou Z, Zhang Y. 2024. Development, validation and reliability testing of the hospice care environment scale. *BMC Palliative Care* **23**:135
DOI [10.1186/s12904-024-01450-2](https://doi.org/10.1186/s12904-024-01450-2).