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Psychometric properties of the Chinese version of the spiritual care competency scale in nursing practice: a methodological study

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ABSTRACT

Objectives To determine the validity and reliability of the Spiritual Care Competency Scale (SCCS) among nurses in China.

Design Methodological research.

Methods After the SCCS was translated into Chinese, the validity and reliability of the Chinese version of the SCCS (C-SCCS) were evaluated using a convenience sample of 800 nurses recruited from different healthcare centres. The construct validity of the C-SCCS was determined by an exploratory factor analysis (EFA) with promax rotation. Pearson's correlation coefficients of the C-SCCS and the Palliative Care Spiritual Care Competency Scale (PCSCCS-M) were computed to assess the concurrent validity and construct validity of the C-SCCS. To verify the quality of the component structure, we conducted a confirmatory factor analysis (CFA). We tested the internal consistency and stability of the measure using Cronbach's alpha coefficient and the Guttman split-half coefficient, respectively, and a factorial analysis was performed.

Results A total of 709 participants completed the questionnaire (response rate: 88.63%), and all completed questionnaires were suitable for analysis. Three factors were abstracted from the EFA and explained 58.19% of the total variance. The Cronbach's alpha coefficients of the three subscales were .93, .92, and .89, and the Guttman split-half coefficient for the C-SCCS was .84. The CFA indicated a well-fitting model, and the significant correlations between the C-SCCS and the PCSCCS-M ($r=0.67$, $p<0.01$) showed adequate concurrent validity. Nurses' education and income level showed a significant association with the C-SCCS score.

Conclusion The C-SCCS was shown to be a psychometrically sound instrument for evaluating Chinese nurses' spiritual care competencies.

Strengths and limitations of this study

- The Chinese version of the Spiritual Care Competency Scale (C-SCCS) demonstrated good psychometric properties, enabling the assessment of nursing students' and registered nurses' ability to provide spiritual care for patients.
- The sample size enabled us to determine that the C-SCCS has the ability to discriminate between different subgroups.
- The sample of nurses was mainly from two provinces in China and was obtained using a convenience sampling method; therefore, the findings may not be representative of all nurses in China.
- Further testing in a larger sample is required to explore the details of and reasons for the association between nurses' demographic variables and the three factors of the C-SCCS.
- Further analysis using multiple methods would help to establish the stability of this instrument.

INTRODUCTION

Although the debate on the definition of spiritual care is long-standing, spiritual care in the present study refers to ' recognising and responding to the needs of the human spirit when the individual is facing trauma, illness or sadness, and addressing individuals' need for satisfactory meaning, self-worth, self-expression, the support of faith, the practice of rituals, prayers or sacraments and conversation with sensitive listeners'.[1–11] Spiritual care is viewed as an essential and core element of holistic nursing care and has been integrated into nursing education and nursing practice,[12–16] as it can improve patients' quality of life and health outcomes.[6–18] Optimal spiritual care relies largely on nurses' adequate preparedness to provide it, because nurses are thought to be competent in caring for the spiritual needs of patients[19] and are the chief providers of spiritual care to patients. A close relationship exists between nurses' ability to provide spiritual care to patients and the fulfilment of patients' spiritual needs.[20–23] Being competent in the delivery of such care is regarded as one of nurses' primary professional skills.[18]

Research has found that medical personnel who have undergone spiritual care training are more likely to meet patients' spiritual needs when providing spiritual care.[24–26] In recent years, palliative care practices for clinical symptoms, physical and mental reactions,

family support and spiritual care for malignant tumour patients in a Chinese context have been reported, though such reports are rare. Indeed, in China, nursing students' awareness of palliative care and spiritual care remains low. In the practice of palliative care, practitioners recognise the importance of early palliative and spiritual care education for nursing students. Therefore, educational curricula for teaching palliative and spiritual care to nursing students is gradually being developed. However, many clinical nurses feel poorly prepared to provide care in this area. This is due largely to the lack of spiritual care education provided in junior and undergraduate nursing programmes resulting from a lack of specific content, guidelines and evaluation criteria for providing spiritual care education.[27]

Thus, one issue that needs to be addressed is the current level of nurses' spiritual care competencies and which aspects nurses are expected to acquire or improve to provide such care for patients. Therefore, it is necessary to assess nurses' existing competency levels to determine to what extent they should receive relevant education and training, which would enable them to explore the resources available to assist patients in improving their health and life satisfaction.[28 29] A number of instruments have been developed to evaluate these competencies in some countries, such as the Spiritual Care Competency Scale (SCCS),[18] the Student Survey of Spiritual Care (SSSC)[30] and the Palliative Care Spiritual Care Competency Scale (PCSCCS).[31] However, there is no comprehensive instrument available in mainland China, and little is known about Chinese nurses' capabilities in this regard and the effects of spiritual care in practice. This issue needs to be addressed urgently to inform the education and training sectors.

The SCCS, a self-reported scale first invented by van Leeuwen *et al*[18] measures student nurses' abilities to provide spiritual care to patients. The tool was developed based on the nursing competency profile.[32] The assessed competencies were first mentioned by van Leeuwen and Cusveller[32] in a qualitative literature review and were then confirmed by Baldacchino[33] in a study performed among nurses. The SCCS has been used with nurses and has sound validity and reliability. As there is no mature spiritual care ability assessment tool for nurses in China, we choose the SCCS scale, which has good reliability and validity for translation and cultural adaptation, and test the reliability and validity of the Chinese translation of the SCCS in a representative sample of Chinese-speaking nurses. It is hoped that this study will provide references for the measurement, assessment and development of Chinese nurses' spiritual care competencies.

METHODS

Participants

The study sample consisted of Chinese-speaking nurses working in hospitals in China. They were asked to participate in this cross-sectional study to validate the Chinese version of the SCCS (C-SCCS). Convenience sampling (ie, the selection of the sample was mainly determined by the investigator and targeted different departments to improve the recruitment of potential participants: a convenience sample of 13 departments from across Henan and Jilin provinces with nurse managers were recruited through their connections with members of the larger study team) was used to collect the data.[34] Eight hundred nurses were recruited from 10 healthcare contexts (3 university-affiliated comprehensive hospitals, 2 tumour hospitals, 1 psychiatric hospital, 2 traditional Chinese medicine hospitals, 1 maternal and child health service care centre and 1 community health service centre). There were no exclusion criteria. Data were collected between March and April 2018. A total of 709 nurses completed the survey (response rate: 88.62%).

We obtained informed written consent from every participant; we explained the purpose of the study, informed participants of their right not to participate and to withdraw at any time and specified that this study included no identifying details.

Instruments

The instrument used in this research comprised three parts.

A socialdemographic form

This form consisted of five questions about participants' age, gender, education, working years and work department. These data demonstrated that the participants recruited comprised a representative sample of individuals of different backgrounds.

The Spiritual Care Competency Scale

The original 27-item SCCS was developed by van Leeuwen *et al*.[18] It uses a 5-point Likert scale to evaluate students' or nurses' competency level in spiritual care, with the response options ranging from 1 (strongly disagree) to 5 (strongly agree). There are six distinct domains of the SCCS: assessment and implementation of spiritual care, professionalisation and improvement of the quality of spiritual care, personal support and patient counselling, referral to professionals, attitude towards patients' spirituality and communication. The Cronbach's alphas of these domains are 0.82, 0.82, 0.81, 0.79, 0.56 and 0.71, respectively, with good internal consistency among the subscales.

The Chinese mainland version of the Palliative Care Spiritual Care Competency Scale

The 18-item Chinese version of the PCSCCS, developed by Chen *et al*[31] and translated by Hu *et al*,[35] measures palliative care with respect to professionals' self-reported competencies in providing spiritual care in Taiwan. Hu *et al*[35] verified that the PCSCCS-M can be applied to groups of nurses in areas other than palliative care to measure nurses' spiritual care ability, and the results showed good reliability and validity for a wide range of nursing fields. Therefore, the PCSCCS-M may have a

large range of applications. It contains three distinct components: knowledge and skills regarding spiritual care (Cronbach's alpha: 0.81); self-awareness and attitude towards spiritual care (Cronbach's alpha: 0.89) and spiritual care that meets patients' spiritual needs (Cronbach's alpha: 0.87). Although differences exist between the PCSCCS-M used in the present study and the SCCS (the PCSCCS was developed based on palliative caregivers and the PCSCCS-M has good validity and reliability in samples of clinical nurses, while the SCCS was developed to assess the spiritual care competencies of nursing students), both measurement tools address spiritual care. Therefore, the PCSCCS-M was chosen to test the C-SCCS's concurrent validity.

Translation and adaptation procedures and psychometric testing

We translated the SCCS into Chinese according to Brislin's established translation model.[36] Permission was obtained from Dr van Leeuwen, who developed the original SCCS. Phase I involved four steps. The first step consisted of the forward translation process, in which two translators, one from Jilin University and the other from Naval Medical University, independently translated the scale from English into Chinese. Then, a native speaker of Chinese who also had English fluency and who was not involved in the forward translation process was invited to reconcile the two forward translations. The second step involved back-translation, in which two experts with fluency in English and Chinese (one had studied and worked in an English-speaking country for many years and one has been teaching English for many years in a university of China) translated the reconciled Chinese version back into English. Dr van Leeuwen compared the back-translation with the original version of the SCCS and made any necessary revisions, based on which the final Chinese translation was established.

Phase II consisted of two steps. In the first step, the revised version of the SCCS was pilot tested to evaluate whether the SCCS was easy to understand and complete. The pilot took place in three Jilin University-affiliated teaching hospitals with a convenience sample of 20 nurses (with >5 years of working experience in different departments). Second, the psychometric properties of the C-SCCS were determined, including its face validity, item analysis, construct validity, concurrent validity, internal consistency reliability and stability, as represented by the split-half reliability. The construct validity of the C-SCCS was determined by performing an exploratory factor analysis (EFA) with promax rotation. Concurrent validity is when the results of a test using the targeted instrument are compared with those of other effective tests using another valid measuring method at the same or a similar time by adopting the quantitative method of calculating the correlation coefficient. The higher the correlation coefficient is, the greater the validity of the scale. The general validity should be between 0.4 and 0.7.[37] In the current study, Pearson's correlation coefficients for the C-SCCS and the PCSCCS-M were computed to assess the concurrent validity of the C-SCCS. To verify the quality of the component structure, we conducted a confirmatory factor analysis (CFA) based on other sampling data obtained from 354 nurses. We also tested the scale's internal consistency using Cronbach's alpha coefficient and the scale's stability using the Guttman split-half coefficient.

Data collection

For the data collection, a professional platform called 'SO JUMP' was used.[38] The instruments used in the present study (the socialdemographic form, the C-SCCS and the PCSCCS-M) were distributed to the nurses as a set with an invitation to complete them. First, the content of the questionnaires was entered into the computer. Then, we distributed the questionnaires through personal WeChat messages (a total of 17 nurses) and 4 WeChat chat groups (group 1, 107 nurses; group 2, 161 nurses; group 3, 120 nurses and group 4, 412 nurses) over WhatsApp. Before participants completed the questionnaires, written consent forms were obtained.

Statistical analysis

IBM SPSS V.23.0 was used to perform the data analysis. Descriptive statistics were used to analyse the characteristics of the sample. An alpha level of 0.05 was used for the statistical tests. Item analysis was conducted using the following analyses: (a) criteria value (CR), (b) corrected item-total correlation, (c) factor loading, (d) Cronbach's alpha if an item was deleted and (e) theoretical considerations. In addition, items with a CR <3.0, a corrected item-total correlation <0.30 and whose deletion increased the value of the alpha coefficient for the overall scale by 0.5 or more were dropped. The internal consistency and homogeneity of the C-SCCS were assessed using Cronbach's alpha. Cronbach's alpha values ≥0.80 indicate good internal consistency. The concurrent validity between the C-SCCS and the PCSCCS-M (Chinese version) was assessed by Pearson's correlation coefficient, with a p value <0.05 indicating a positive correlation. The C-SCCS's construct validity was analysed via EFA using principal axis factor analysis with oblique rotation if the correlation between the factors was >0.3 and principal component analysis with varimax rotation otherwise. Prior to performing EFA, the Kaiser-Meyer-Olkin (KMO) test (a test of sampling adequacy) and Bartlett's test of sphericity (a test of the suitability of the correlation matrix for factor analysis) were conducted. The criteria for factor extraction were an eigenvalue >1.0 and a factor loading >0.40. To assess the impact of the participants' characteristics on the outcomes, Student's t-test or the F test was used, and a p value <0.05 was accepted as statistically significant.

A CFA was carried out using AMOS V.20.0 to further verify the construct validity of the C-SCCS. The results were reported using the Strengthening the Reporting

of Observational Studies in Epidemiology cross-sectional study reporting guidelines.[39]

Patient and public involvement

No patients were involved in this study. The experts who consulted or translated the study and the nurses who completed the questionnaires were considered as a form of public involvement. No participants were involved in developing the questionnaire or designing or conducting the study. However, we plan to share the findings with several nurse managers so that they can understand nurses' spiritual care ability levels.

RESULTS

Sample characteristics

A total of 709 (out of a possible 800) nurses completed the survey (response rate: 88.63%). All of the questionnaires obtained (n=709) were suitable for this study. Fifty per cent of the sample was randomly selected for EFA (n=355), and the remaining samples were selected for CFA (n=354). In the sample used for EFA, the majority of the nurses were female (n=335, 94.4%) and had an undergraduate education level (73.2%). The average length of employment was 10.39 years (SD 8.84). The main characteristics of the participants whose data were used for EFA are illustrated in table 1.

Table 1 Social and demographic information of the participants (n=355)

Variable	Number	Per cent (%)
Gender		
Male	20	5.6
Female	335	94.4
Age, years		
18–26	64	18.0
27–31	116	32.7
31–40	131	36.9
41–50	39	11.0
≥51	5	1.4
Education		
Secondary vocational school	2	0.6
Junior college	68	19.2
Undergraduate	260	73.2
Postgraduate or above	25	7.0
Department		
Internal medicine	122	34.4
Surgical	63	17.7
Paediatrics	14	3.9
Obstetrics and gynaecology	29	8.2
Emergency	13	3.7
ICU	12	3.4
Operating room	4	1.1
Outpatient services	14	3.9
Psychiatric	41	11.5
Other	43	12.1
Income (￥/month)		
<5000	203	57.2
≥5000	152	42.8
Working years, years (M±SD)	10.39	(8.84)

Psychometric analyses

Item analysis

The internal consistency analysis of the 27-item C-SCCS showed that the average of each item score ranged from 3.63 to 4.21. Item-total correlations ranged from 0.52 to 0.80. Each corrected item-total correlation was positive, with values between 0.43 and 0.77, showing moderate to strong correlation. All CR values were >3.0, ranging from 5.62 to 17.05. The internal consistency of the 27-item C-SCCS was satisfactory, with Cronbach's alphas of 0.93, 0.92 and 0.89, and the deletion of any items in the scale would not have improved the Cronbach's alpha of the scale. The results of the item analysis indicated that no items needed to be deleted (table 2).

Face validity, construct validity and concurrent validity

To evaluate the face validity of the scale, the C-SCCS was given to 20 nurses from hospitals of three different levels to assess their interpretation of the scale items. The nurses stated that the wording of most of the C-SCCS items was easy to understand. EFA was used to evaluate the construct validity of the C-SCCS. Three distinct factors were extracted. This model could explain 58.19% of the total variance (table 3). In addition, the factor loading on all items was >0.30. The percentages of variance for the C-SCCS subscales are listed in table 4. The correlation of the C-SCCS with the PCSCCS-M was 0.67 (p<0.01, table 5 shows this in more detail), demonstrating good concurrent validity.

Internal consistency reliability, split-half reliability and model fit

The KMO value of the C-SCCS was 0.95, which was better than 0.50 (the minimal admissible level); the results of Bartlett's test of sphericity were also acceptable (approximate χ^2=6896.34, df=351, p<0.001), showing the suitability of EFA. The EFA demonstrated that for the subscales for assessment, implementation, professionalisation and quality improvement of spiritual care (factor 1), personal and team support (factor 2) and attitude towards patient spirituality and communication (factor 3), the Cronbach's alpha coefficients were 0.93, 0.92 and 0.89, respectively (table 4). Table 2 shows detailed information on the item analysis. The Guttman split-half coefficient of the C-SCCS was 0.84, indicating its adequate reliability. Table 6 shows the various indices of goodness-of-fit for the model of the present study and the original model of the SCCS based on the current sample data. The three-factor

Table 2 Internal consistency of the C-SCCS (n=355)

Items	Mean±SD	Critical ratio	Item-total correlation	Adjusted item-total correlation	Cronbach's α if item deleted	C^2	Factor loading
C1	3.70±0.71	12.68*	0.65*	0.59	0.95	0.43	0.49
C2	3.92±0.57	8.75*	0.68*	0.63	0.95	0.44	0.59
C3	3.91±0.57	10.33*	0.71*	0.66	0.95	0.51	0.66
C4	3.80±0.70	11.28*	0.68*	0.63	0.95	0.48	0.57
C5	3.67±0.77	15.24*	0.71*	0.67	0.95	0.52	0.63
C6	3.75±0.74	11.60*	0.69*	0.64	0.95	0.51	0.59
C7	3.82±0.67	13.51*	0.80*	0.77	0.95	0.69	0.71
C8	3.90±0.65	12.23*	0.78*	0.74	0.95	0.63	0.65
C9	3.89±0.61	10.88*	0.74*	0.70	0.95	0.59	0.63
C10	3.89±0.63	10.52*	0.72*	0.67	0.95	0.60	0.79
C11	3.84±0.65	11.43*	0.73*	0.69	0.95	0.58	0.81
C12	3.85±0.65	13.16*	0.76*	0.72	0.95	0.59	0.76
C13	3.98±0.62	11.05*	0.77*	0.73	0.95	0.60	0.63
C14	3.87±0.66	11.76*	0.78*	0.74	0.95	0.61	0.64
C15	3.66±0.81	14.85*	0.73*	0.69	0.95	0.65	0.71
C16	3.63±0.85	13.63*	0.69*	0.64	0.95	0.68	0.74
C17	3.86±0.72	13.11*	0.76*	0.72	0.95	0.56	0.60
C18	3.71±0.81	12.33*	0.68*	0.63	0.95	0.67	0.73
C19	3.78±0.77	17.05*	0.76*	0.73	0.95	0.66	0.70
C20	3.69±0.81	14.06*	0.71*	0.66	0.95	0.74	0.77
C21	3.73±0.71	12.64*	0.69*	0.64	0.95	0.50	0.58
C22	4.05±0.63	6.87*	0.57*	0.50	0.95	0.50	0.62
C23	4.08±0.60	6.40*	0.55*	0.48	0.95	0.56	0.65
C24	4.21±0.55	5.620*	0.52*	0.43	0.95	0.64	0.72
C25	4.06±0.61	7.56*	0.64*	0.57	0.95	0.55	0.62
C26	4.12±0.58	7.01*	0.63*	0.57	0.95	0.62	0.68
C27	4.12±0.55	7.31*	0.59*	0.52	0.95	0.63	0.69

*P<0.01. Cronbach's α=0.95; Guttman split-half coefficient=0.84; Spearman-Brown coefficient=0.84.
C^2, communalities; SCCS, Chinese version of Spiritual Care Competency Scale.

model of the C-SCCS showed a more adequate fit than the six-factor model, but the fit indices of both models were ideal.

Table 7 shows the association between the nurses' demographic variables and the three factors of the C-SCCS. We found significant associations between the nurses' education level and factor 2, 'personal and team support' (F=3.394, p=0.018). The nurses with a junior college or undergraduate-level education appeared to score higher on the factor 'personal and team spiritual support'. The post hoc analysis showed a significantly higher proportion of junior college-educated and undergraduate-educated nurses than of nurses with a graduate-level education and above who were competent in providing personal and team spiritual support for patients (mean difference (I–J), 3.94; p=0.008 for junior college-educated nurses

Table 3 Total variance explained using exploratory factor analysis

	Initial eigenvalues			Extraction sums of squared loading			Rotation sums of squared loading
Factor	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	12.44	46.09	46.09	12.03	44.55	44.55	11.08
2	2.53	9.37	55.45	2.12	7.87	52.42	8.80
3	1.93	7.13	62.59	1.56	5.77	58.19	6.77

Table 4 Factor analysis results for the Chinese version of the Spiritual Care Competency Scale (C-SCCS)[a] (n=355)

Items	Structure matrix/factor 1	2	3	CIFC	CIID	IM	SD
Factor 1* Assessment, implementation, professionalisation and quality improvement of spiritual care 维度**1**：灵性照护评估，实施，专业化与质量提高 (Cronbach's α=0.93; Guttman split-half coefficient=0.87)						3.83	0.66
C1 我能口头或书面报告患者的灵性 (心灵) 需求 1) I can report orally and/or in writing on a patient's spiritual needs	0.62	0.46	0.36	0.60	0.93		
C2 我能通过与患者协商而使护理适用于患者的灵性需求/问题 2) I can tailor care to a patient's spiritual needs/problems in consultation with the patient	0.65	0.45	0.45	0.64	0.93		
C3 我能通过多学科咨询而使护理适用于患者的灵性需求/问题 3) I can tailor care to a patient's spiritual needs/problems through multidisciplinary consultation	0.72	0.48	0.39	0.70	0.93		
C4 我能在护理计划中记录患者灵性照护的护理成分 4) I can record the nursing component of a patient's spiritual care in the nursing plan	0.69	0.48	0.33	0.68	0.93		
C5 我能书面报告患者的心灵机能 (功能) 5) I can report in writing on a patient's spiritual functioning	0.71	0.55	0.32	0.70	0.93		
C6 我能口头报告患者的心灵机能 6) I can report orally on a patient's spiritual functioning	0.71	0.44	0.37	0.69	0.93		
C7 我能为护理单元内灵性护理方面的质量保证发挥作用 7) Within the nursing ward, I can contribute to quality assurance in the area of spiritual care	0.83	0.58	0.46	0.81	0.92		
C8 我能为护理单元内灵性护理的专业发展发挥作用 8) Within the nursing ward, I can contribute to professional development in the area of spiritual care	0.79	0.56	0.47	0.76	0.92		
C9 与护理单元同行的讨论中,我能识别关于灵性护理的问题 9) Within the nursing ward, I can identify problems relating to spiritual care in peer discussion sessions	0.76	0.48	0.46	0.72	0.93		
C10 我能为其他照顾者提供患者灵性护理方面的指导 10) I can coach other care workers in the area of spiritual care delivery to patients	0.77	0.44	0.38	0.73	0.92		
C11 我能向护理单元的管理者提出灵性护理方面的政策建议 11) I can make policy recommendations on aspects of spiritual care to the management of the nursing ward	0.76	0.50	0.39	0.72	0.93		
C12 我能在护理单元内实施灵性护理的改进方案 12) I can implement a spiritual care improvement project in the nursing ward	0.76	0.58	0.39	0.71	0.93		
Factor 2* Personal and team support attitude towards patient spirituality and communication (factor 3) 维度**2**：个体与团体支持 (Cronbach's α=0.92; Guttman split-half coefficient=0.90)						3.77	0.76
C13 我能给患者提供灵性护理 13) I can provide a patient with spiritual care	0.77	0.56	0.46	0.62	0.92		
C14 我能评价在征询患者, 多学科或多学科团队后提供的灵性护理 14) I can evaluate the spiritual care that I have provided in consultation with the patient and with the disciplinary/multidisciplinary team	0.78	0.60	0.44	0.64	0.92		
C15 我能给予患者护理机构中关于灵性的设施信息 (包括灵性护理, 冥想中心, 宗教服务) 15) I can give a patient information about spiritual facilities within the care institution (including spiritual care, meditation centres, religious services)	0.60	0.80	0.35	0.78	0.91		
C16 我能帮助患者继续他/她每天的灵性操练 (包括提供仪式, 祈祷, 冥想, 阅读圣经/古兰经, 听音乐的机会) 16) I can help a patient continue his or her daily spiritual practices (including providing opportunities for rituals, prayer, meditation, reading the Bible/Koran, listening to music)	0.51	0.82	0.35	0.76	0.91		
C17 我能在日常护理 (如身体护理) 中致力于患者的灵性护理 17) I can attend to a patient's spirituality during daily care (eg, physical care)	0.66	0.70	0.48	0.71	0.91		
C18 如果患者的家庭成员问我或表达他们的灵性需求, 我能把他们推介给灵性导师/牧师等 18) I can refer members of a patient's family to a spiritual adviser/pastor, etc, if they ask me and/or if they express spiritual needs	0.52	0.82	0.31	0.75	0.91		

Continued

Table 4 Continued

Items	Structure matrix/factor 1	2	3	CIFC	CIID	IM	SD
C19我能有效地将患者的灵性照护需求分配给不同的护理提供者或护理工作者或护理训练者/培训者 19) I can effectively assign care for a patient's spiritual needs to another care provider/care worker/care discipline	0.65	0.80	0.39	0.78	0.91		
C20 患者有灵性护理的诉求时, 我能用及时有效的方式将他或她介绍给另一位护理提供者 (例如：牧师 (包括患者的私人牧师) /伊玛目 (阿訇/心理咨询师/精神心理科医师/灵性导师) 20) At the request of a patient with spiritual needs, I can in a timely and effective manner refer him or her to another care worker (eg, a chaplain/the patient's own priest/imam)	0.52	0.85	0.40	0.78	0.91		
C21 我知道什么时候应该向灵性导师咨询患者的灵性护理问题 21) I know when I should consult a spiritual adviser concerning a patient's spiritual care	0.57	0.69	0.37	0.67	0.92		
Factor 3* Attitude towards patient spirituality and communication 维度**3**：对患者灵性的态度与沟通交流 (Cronbach's α=0.89; Guttman split-half coefficient=0.83)						4.11	0.59
C22不论患者的灵性或宗教背景怎样,我都表现出公平地尊重他/她的灵性或宗教 22) I show unprejudiced respect for a patient's spiritual/religious beliefs regardless of his or her spiritual/religious background	0.40	0.37	0.70	0.66	0.87		
C23 即使患者的信仰与我的不同,我也不限制 (不抵触) 他们的灵性或宗教信仰 23) I am open to a patient's spiritual/religious beliefs, even if they differ from my own	0.40	0.28	0.74	0.70	0.87		
C24 我不会试图把自己的灵性或宗教信仰强加给患者 24) I do not try to impose my own spiritual/religious beliefs on a patient	0.33	0.26	0.79	0.73	0.86		
C25 我能意识到我对待患者的灵性或宗教信仰的个人局限性 25) I am aware of my personal limitations when dealing with a patient's spiritual/religious beliefs	0.45	0.49	0.71	0.66	0.87		
C26 我能主动地倾听患者述说他/她的患病或缺陷 (残障) 的"生命故事" 26) I can listen actively to a patient's 'life story' in relation to his or her illness/handicap	0.50	0.37	0.78	0.72	0.86		
C27 我与患者交往时,秉持接受的态度 (关心的, 同情的, 激励人心的信任和信心, 感同身受的, 诚恳的, 敏感的, 真诚的和私人的) 27) I have an accepting attitude in my dealings with a patient (concerned, sympathetic, inspiring trust and confidence, empathetic, genuine, sensitive, sincere and personal)	0.43	0.35	0.79	0.73	0.86		
Cumulative interpretation of variance %							58.19

[a] KMO=0.95, Bartlett's test of sphericity: approximate X^2=6806.34, df=351, p=0.000.
*Spearman-Brown coefficient=0.87, 0.90, 0.83; extraction method: principal axis factoring. Rotation method: promax with Kaiser normalisation. Items with a factor loading >0.40 were retained for that factor.
CIFC, corrected item-factor correlation;CIID, Cronbach's α if item deleted; IM, item mean; KMO, Kaiser-Meyer-Olkin.

Table 5 Cronbach's alpha and Pearson's product-moment correlations between the C-SCCS and PCSCCS-M

Measures	C-SCCS	Factor 1	Factor 2	Factor 3	PCSCCS-M	PCSCCS-M 1	PCSCCS-M 2	PCSCCS-M 3
C-SCCS	α=0.95							
Factor 1	0.93**	α=0.93						
Factor 2	0.91**	0.75**	α=0.92					
Factor 3	0.68**	0.51**	0.49**	α=0.89				
PCSCCS-M	0.67**	0.60**	0.63**	0.45**	α=0.93			
PCSCCS-M 1	0.60**	0.56**	0.56**	0.36**	0.85**	α=0.81		
PCSCCS-M 2	0.62**	0.56**	0.53**	0.54**	0.90**	0.69**	α=0.89	
PCSCCS-M 3	0.57**	0.50**	0.59**	0.31**	0.91**	0.65**	0.70**	α=0.87

Pearson's correlation coefficient test was used, two-tailed. Cronbach's alpha values are on the diagonal. SCCS: assessment, implementation, professionalisation and quality improvement of spiritual care (factor 1), personal and team support (factor 2) and attitude towards patient spirituality and communication (factor 3). PCSCCS-M: self-awareness of spiritual care (PCSCCS-M 1), nurses' perceived knowledge about spiritual care (PCSCCS-M 2) and attitudes about spiritual care (PCSCCS-M 3).
**p<0.01.
C-SCCS, Chinese version of SCCS; PCSCCS-M, Palliative Care Spiritual Care Competency Scale; SCCS, Spiritual Care Competency Scale.

compared with nurses with a graduate-level education and above; mean difference (I–J): 2.90; p=0.009 for undergraduate-educated nurses compared with nurses with a graduate-level education and above). Surprisingly, lower-income nurses scored higher than those earning an average of RMB 5000 or more per month in all aspects of their spiritual care competencies. Neither gender, age nor working years was associated with nurses' abilities to provide spiritual care.

Table 6 Results of the confirmatory factor analysis (n=354)

Model fit summary	Standard model fit	Adjusted model fit	Ideal value
CMIN/df	4.209	2.263	≤3
RMR	0.034	0.03	<0.1
RMSEA	0.095	0.06	0.05–0.08
GFI	0.78	0.88	≥0.85
AGFI	0.74	0.85	≥0.80
NFI	0.80	0.90	≥0.90
RFI	0.78	0.88	≥0.90
IFI	0.84	0.94	≥0.90
TLI	0.82	0.93	≥0.90
CFI	0.84	0.94	≥0.90
PNFI	0.73	0.74	>0.50
PCFI	0.77	0.77	>0.50

AGFI, adjusted goodness-of-fit index; CFI, comparative-of-fit index; CMIN/df, Chi-square goodness-of-fit test; GFI, goodness-of-fit index; IFI, incremental-of-fit index; NFI, normal-of-fit index; PCFI, parsimony comparative-of-fit index; PNFI, parsimony normed-of-fit index; RFI, Relative-of-fit index; RMR, root of the mean square residual; RMSEA, root mean square error of approximation; TLI, Tucker-Lewis index.

DISCUSSION

The main purpose of this current study was to translate the English version of the well-validated SCCS into Chinese and to examine the reliability and validity of the C-SCCS. The sample for this study was selected from 10 different types of locations, including hospitals of different levels and various departments. To some extent, the results should represent a variety of nurses with diverse backgrounds. As a whole, in our study sample, the C-SCCS showed good face validity, construct validity, concurrent validity and internal consistency.

Compared with the original English version of the SCCS, the C-SCCS performed well, with Cronbach's alpha coefficients of 0.93, 0.92 and 0.89 for the three subscales. These Cronbach's alpha values were higher than those of the six-domain model of the English version, which were 0.82, 0.82, 0.81, 0.79, 0.56 and 0.70. Over 58% of the total variance could be explained by the current three-factor model, better than the 53% shown in the English version. The split-half internal consistency measure of the scale revealed a correlation of 0.84 between the two halves, which also proved the sound reliability of the C-SCCS. In addition, the C-SCCS showed significantly moderate levels of concurrent validity with the PCSCCS-M, indicating that these measures have unique constructs. There was a minor difference between the number of factors extracted in the present study and that reported in studies conducted by van Leeuwen *et al*,[18] who performed an EFA on 27 items and obtained 6 common factors. However, the Chinese version and the English version had the same number of items in each subscale, which was consistent with the theoretical structure of the original scale. Therefore, there was no barrier to naming each factor, and they were labelled as follows: assessment, implementation, professionalisation and quality improvement of spiritual care (SCCS 1), personal and team support (SCCS 2) and attitude towards patient spirituality and communication (SCCS 3).

Table 7 Association between the Chinese version of the Spiritual Care Competency Scale and patient characteristics

Test variable	Groups	Frequency (n)	Total (M±SD)	Factor 1 (M±SD)	Factor 2 (M±SD)	Factor 3 (M±SD)
Gender	Male	20	104.05±9.33	45.25±5.23	34.60±3.73	24.20±2.88
	Female	335	104.51±12.49	45.99±6.03	33.85±5.42	24.67±2.81
t value			−0.163	−0.540	0.607	−0.719
P value			0.870	0.590	0.544	472
Age, years	≥18	64	106.59±9.65	24.50±2.12	34.94±4.33	24.50±2.12
	≥26	116	103.76±13.50	24.79±3.05	33.57±5.79	24.79±3.05
	≥31	131	103.27±12.89	24.50±3.03	33.44±5.57	24.50±3.03
	≥41	39	106.459.67	24.90 ± 2.30	34.38 ± 4.45	24.90 ± 2.30
	≥51	5	111.20±14.79	24.60±3.29	36.404.98	24.60±3.29
F value			1.514	2.302	1.325	0.291
P value			0.198	0.058	0.260	0.884
Working years	>0	124	104.75±11.97	45.96±5.72	34.06±5.28	24.73±2.69
	≥6	111	104.44±13.40	45.74±6.67	33.91±5.69	24.79±3.10
	≥11	120	104.26±11.72	46.14±5.61	33.71±5.08	24.41±2.66
F value			0.049	0.130	0.136	0.628
P value			0.952	0.878	0.873	0.534
Education	Secondary vocational school (A)	2	102.50±13.44	43.00±1.41	34.00±5.66	25.50±6.36
	Junior college (B)	68	106.66±12.15	46.85±5.96	34.94±4.79	24.87±2.85
	Undergraduate (C)	260	104.47±12.16	45.98±5.91	33.90±5.27	24.58±2.75
	Postgraduate or above (D)	25	98.92±13.34	43.40±6.46	31.00±6.58	24.52±3.22
F value			2.455	2.217	3.394	0.258
P value			0.063	0.086	0.018	0.855
Post hoc tests	Schrieffer method				C>D†	
	Turkey HSD				B>D‡; C>D§	
	LSD method				B>D¶; C>D**	
Income (¥/month)	<5000	203	106.55±12.20	46.93±5.91	34.64±5.30	24.98±2.72
	≥5000	152	101.74±12.00	44.64±5.85	32.90±5.23	24.19±2.87
t value			13.721	13.125	0.9.459	6.887
P value			0.000	0.000	0.002	0.009

†Mean difference (I–J), 3.94; SE=1.24; p=0.018.
‡Mean difference (I–J): 3.94; SE=1.24; p=0.008.
§Mean difference (I–J): 2.90; SE=1.11; p=0.045.
¶Mean difference (I–J): 3.94; SE=1.24; p=0.002.
**Mean difference (I–J): 2.90; SE=1.11; p=0.009.
HSD, honestly significant difference; LSD, least significant difference.

In addition, the C-SCCS showed good concurrent validity, with a connection between the PCSCCS-M that evaluated an identical feature. Statistically significant correlations between the C-SCCS and the PCSCCS-M (r=0.67, p<0.01) were found. Therefore, it can be concluded that the C-SCCS was sensitive enough to evaluate features similar to those evaluated by the PCSCCS-M.

Regarding the translation equivalence of the C-SCCS, most of the items appeared to have culturally equivalent terms in Chinese, and we were able to complete the translation without too much further cultural adaptation. There were two exceptions. One was the concept of 'spiritual'. We formulated and modified some of the expressions, such as 'mind', 'mental' and 'psych-', replacing them with 'spiritual', in accordance with Dr van Leeuwen's recommendation and the concept of mental health.[40] The other exception was that, to adapt to the different cultural background, we used the Chinese words '心灵', which translate to 'spiritual care', in some sentences at the suggestion of several of the experts.

Given the evidence supporting the advantages of recognising nurses' capabilities in providing spiritual care, the number of studies assessing spiritual care has increased in recent years. Although some of these studies show that spiritual care can improve patients' health outcomes, this aspect of care has not been given adequate attention in

nursing practice. Barriers to research on spiritual care may include the nurses being underprepared for this aspect of their role, their lack of confidence, their perceived incompetence in providing spiritual care and the inadequacy of the education they received.[19 41 42] To optimally deliver such care to patients, nurses need to be knowledgeable about this topic and should receive education or training to become more knowledgeable. Identifying these issues using an instrument proven to be valid by the current study will allow nurses to explore the resources available to assist them in improving their expertise in spiritual care to meet patients' spiritual needs.

Although the SCCS primarily targeted nursing students, it was found to be a valid and reliable multidimensional tool for Chinese clinical nursing staff with multicultural backgrounds to assess nurses' competencies in the provision of spiritual care. Evaluations using this tool will allow managers to formulate strategies to provide nurses with the spiritual care skills required to practice optimally and to assist nurses in improving their care quality.

Importantly, our results also revealed that nurses with lower levels of education (junior college and undergraduate) scored higher on the C-SCCS. Additionally, junior college-educated and undergraduate-educated nurses had significantly higher levels of spiritual care competence than nurses with a graduate-level education or above. This difference may be due to the small sample of nurses with a graduate or above education. However, there may be other reasons for this difference that should be explored. Additionally, higher-income nurses scored lower than those earning an average of less than RBM 5000 per month in all aspects of their ability to provide patients with spiritual care. This result was unexpected but may be because higher-income nurses generally live in densely populated metropolitan areas where consumption levels and life pressures are generally higher, offsetting their seemingly higher incomes. In addition, large hospitals in large cities are generally larger in scale, with more patients and a shortage of nurses, causing the workload of nurses to be higher and leaving no time and energy for them to provide spiritual care for patients.

Study limitations and directions for future research

There are several limitations. First, because a sample of nurses mainly from Henan Province and Jilin Province of China was recruited and the nurses' data in the present study were obtained using a convenience sampling method, the findings may not represent all nurses in China. Second, the use of the online-based questionnaire format instead of the original paper-based C-SCCS could lead to differences in validity between the online and paper forms. The use of an online questionnaire could also influence the responses due to unfamiliarity with online questionnaires and potential errors in responding using a mobile device. There are some implications for future research. The PCSCCS-M was chosen to evaluate the concurrent validity of the C-SCCS. The PCSCCS-M measures palliative caregivers' perceived awareness, ability and attitudes with respect to spirituality and spiritual care. There was moderate concurrent validity between the C-SCCS and the PCSCCS-M. Future studies could attempt to establish a structural equation model (SEM) to further analyse the factors influencing nurses' spiritual care perceptions and competencies and their relationships.

The study findings provided further support for the validity and reliability of the SCCS and its usefulness as a tool to measure nurses' competencies in spiritual care. The modified model showed good fit (CMIN/df=2.26; RMR=0.03; root mean square error of approximation=0.06; GFI=0.88; AGFI=0.85; IFI=0.94; TLI=0.93; table 6). However, the online supplementary figure also shows that the model may have multicollinearity due to cross-loading and may need further modification. Future research should enlarge the sample size and use exploratory structural equation modelling,[43 44] which may integrate features of EFA, CFA and SEM to overcome some of the limits of a single CFA.

CONCLUSIONS

Overall, the translated C-SCCS showed good reliability and validity in our study sample. It was found to be a potentially useful instrument for measuring nurses' perceived spiritual care competency in China. Further analysis using multiple methods would help to establish the stability of this instrument. Recruitment of a larger sample that is more representative of the Chinese nursing population and applications of the C-SCCS in other settings or to other healthcare providers are necessary in the future.

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Contributors YH led the analysis plan, conducted the data analysis, interpreted the findings and drafted the manuscript. RvL confirmed and modified the back-translated version of the SCCS, reviewed the manuscript, revised it critically for important intellectual content and edited it to ensure readability in English. FL was responsible for the study design, supervised the study, led the data collection,

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