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Psychometric evaluation of the Chinese version of the Snizek-revised Hall's Professionalism Inventory Scale

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Abstract

Objective: This study was performed to assess the reliability and validity of the Chinese version of the Snizek-revised Hall's Professionalism Inventory Scale (C-SR-HPIS).

Methods: Exploratory factor analysis and confirmatory factor analysis were used to evaluate the construct validity of the C-SR-HPIS. The average variance extracted (AVE) and square root of the AVE were calculated and correlation analyses were performed to test the convergent validity and discriminant validity, respectively. Cronbach's alpha (α) coefficient was used to test the internal consistency reliability.

Results: Data for 355 clinical nurses in mainland China were collected. Five factors were extracted, accounting for 58.86% of the total explained variance, and 20 items were selected for the C-SR-HPIS. The confirmatory factor analysis suggested good fitness of the modified model. The AVE was acceptable for convergent validity. The square roots of the AVE of the five factors were larger than their correlation coefficients with other factors, showing suitable discriminant validity. Cronbach's α coefficient of internal consistency reliability of the overall scale was 0.76, indicating good reliability of the scale.

Conclusions: This study demonstrated good reliability and validity of the C-SR-HPIS and provides a quantitative tool for the assessment of nursing professionalism in China.

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Introduction

The professionalism of health care workers has been extensively discussed and advocated by experts and scholars. Its development in nursing reflects role competence and job satisfaction of nurse practitioners, patient satisfaction, individual and collective professional development, and the quality of health care.[1–5] A national survey in Japan performed by Tanaka et al.[6,7] illustrated that nurse managers continued their self-development and fulfilled the potential of their nursing staff by developing professionalism. Enhancement of nursing professionalism has been recommended as a strategy to promote job satisfaction and improve job retention across different health systems.[8,9] Nursing professionalism has been identified as the most critical element of nurses' professional values.[10–14]

Nursing professionalism refers to how nurses view their work.[5,8,15] It reflects the ideology and attitudes representing the level of identification and commitment to the profession held by the practitioner. Kramer[16] quantified professionalism by assessing the number of professional books purchased, subscriptions to journals, hours spent in reading and continuing education, participation in professional organizations, number of articles published, number of speeches given, committee activity, and participation in research. Miller et al.[17] constructed a wheel model and developed a behavioral inventory to evaluate professionalism in nursing. Most of the published quantitative research on the professionalism of nurses has focused on professional behavior in nursing. However, behavior can reflect but not necessarily equate to an attitude of professionalism, which plays an important role in guiding and shaping the professionalism of nurses. Notably, research on nurses' attitudes toward professionalism has been limited.

In China, nursing professionalism has received more attention and support from policy-makers in recent years. China's Ministry of Education formally upgraded the nursing profession, subordinated to clinical medicine since 2011, from a second-class to a first-class discipline.[18] In community health service centers of several pilot cities, nurse practitioners are allowed to practice independently with limited prescription rights. Additionally, the scale of the nursing workforce has rapidly increased; mainland China has shown an average annual increase of 200,000 nurses, especially those with higher diplomas.[19] However, no suitable or operational method has been established for the evaluation of nurses' attitudes toward nursing professionalism in China.

As early as 1968, Hall[15] proposed a professional model to examine the professionalization process. This model categorized the attributes of a profession into two aspects: structure and attitude. The development of the nursing profession in China has met the structural attributes of Hall's professional model. For the attitudinal attributes, Hall constructed five dimensions to represent the degrees of professionalism: use of professional organizations as a

reference, belief in public service, belief in self-regulation, a sense of calling to the field, and autonomy. To measure the level of professionalism and dimensions thereof, Hall devised a 50-item scale called the Hall's Professionalism Inventory Scale (HPIS). The HPIS was later reassessed and revised by Snizek,[20] who retained 5 of 10 items for each dimension of the HPIS, resulting in a 25-item scale. The Snizek-revised HPIS (SR-HPIS) uses a 5-point Likert scale for each item to indicate the degree of consistency in attitudes. The total score of the SR-HPIS ranges from 25 to 125, and the overall Cronbach's alpha (α) coefficient is 0.78.[20] Over the years, Hall's professional model and its corresponding instrument have been extensively and successfully used by some researchers to assess nursing professionalism,[21–23] providing a foundation for examination and evaluation of its growth.

This study was performed to revise the quantitative SR-HPIS instrument to create a Chinese version (C-SR-HPIS) by cultural adaptation and validation in mainland China for measurement of the professional attitudes of Chinese nurses.

Methods

Translation procedures and psychometric testing

All translation processes followed the Brislin[24] model: forward translation, back-translation, cultural adaptation, and a pilot study to maintain semantic and cultural equivalence.

First, three bilingual translators, two of whom were Chinese-American registered nurses who had worked in the United States for 5 years and one of whom was an expert on professionalism in medical sociology, separately translated the original SR-HPIS into the Chinese language. They discussed and modified three versions of the translated SR-HPIS together until a consensus regarding the wording and expression of one initial C-SR-HPIS was achieved. Next, the C-SR-HPIS was translated back into English by two professors from the School of Foreign Languages and the Nursing College and by one bilingual nurse with clinical and teaching experience. All three of these professionals carried out their translation work independently, without reading the original SR-HPIS. After they had blindly translated the SR-HPIS back into English, we invited three experts who had published research on professionalism to discuss the discrepancies across the three translations and compose the most appropriate and accurate translation.

We enlisted six experts to assist with the process of cultural adaptation: two methodologists who had introduced the scale several times, two Chinese clinical experts who had worked in the United States for 10 years, and two nursing experts who had been working in nursing for more than 10 years. We submitted all materials used in the process of selection and translation of the scale to these six experts. After comparing the original English version and the back-translated version to ensure semantic equivalence, they individually reviewed each version in an item-by-item manner and made recommendations based on the questions, unified any disagreements in the translation process, and determined whether the translated scale was relevant to Chinese context, both semantically and culturally. Items that were not concise or did not fit into a Chinese context were rewritten or rephrased.

Next, to identify whether the meaning of the items could be clearly understood and to estimate time requirements, we recruited 20 representative clinical nurses from 5 departments of 4 hospitals to complete the C-SR-HPIS. We arranged the order of items randomly in our scale because some nurses reported that they are more likely to

select the same attitude responses to similar questions in order of dimension. Finally, we settled on a formal version of a user-friendly C-SR-HPIS questionnaire.

Instrument

The C-SR-HPIS questionnaire includes three parts: a cover letter that addresses the purpose of the study, requests informed consent, and explains the item-response text; the C-SR-HPIS itself; and a table for sociodemographic information (age, education level, professional title, years of experience, and membership in professional organizations).

The C-SR-HPIS is composed of 25 Likert-type items rated with a score of 1 to 5, where 1 = very poorly, 2 = poorly, 3 = not sure, 4 = well, and 5 = very well. The respondents were instructed to circle their responses by means of paper and pencil according to the degree of their attitudinal agreement with each item. The questionnaire includes 11 negative questions (Q2, Q8, Q10, Q12, Q13, Q15, Q16, Q17, Q18, Q21, and Q25). Their item score equals six negative response scores. The total score is obtained by summing the numeric responses to each item. The possible total score ranges from 25 to 125, and a higher score indicates stronger professionalism.

Participants

In China, tertiary and secondary hospitals have high numbers of specialists and concise divisions of labor among health staff members, including doctors, nurses, technicians, pharmacists, and assistant personnel; thus, nursing work in these hospitals is considered to be highly professional and standardized rather than playing a supplementary or auxiliary role, as in other health institutions. Considering the characteristics of nursing staff and professional work, the nurses included in our study were required to have an education level higher than a college diploma, be qualified as a Chinese registered nurse, and have more than 1 year of working experience. The exclusion criteria were lack of a qualification certificate, status as a refresher nurse, and status as a probationer nurse.

Data collection

The recommended item:respondent ratio ranges from 1:4 to 1:10.[25,26] A sample size of 250 was calculated as adequate for our study to test the scale and factor analysis. We used a two-stage sampling method. First, we performed convenience sampling of four hospitals: one tertiary and one secondary hospital each in both Guangdong Province and Hubei Province. Second, in each hospital, we recruited a sample population of 100 nurses according to the numbers of nurses in the fields of internal medicine, surgery, obstetrics and gynecology, pediatrics, and emergency medicine.

Before distributing the questionnaire, the investigator explained the purpose of the study and emphasized that the nurses were not required to participate and that participation would have no influence on their work. The investigator also explained that nurses who wanted to participate in the study should read and sign the informed consent form, which was located on the cover of the questionnaire. The investigator retrieved the questionnaires after all participants had finished completing them. From April to November 2015, we distributed 400 questionnaires to registered clinical nurses from 5 departments of 4 hospitals to ensure a representative sample. The entire process was undertaken by four well-trained program investigators under the guidance of two quality controllers. The study was approved by the ethics committee of the School of Public Health, Sun

Yat-Sen University, and written informed consent was obtained from all nurses.

Data analysis

After the completed questionnaires had been returned, we excluded questionnaires from individuals who provided no response to more than 10% (two) of the items, whose sociodemographic information was incomplete, and whose responses indicated conflicts in logic. We then entered the data into EpiData3.1 for Windows (EpiData Association, Odense, Denmark) using double-blind input, logic check, and consistency check. We used SPSS 20.0 for Windows (IBM Corp., Armonk, NY, USA) and reversely scored 11 items with negative statements to analyze the data. If the item had a negative correlation with the total score (item-total Pearson correlation of <0), it was deleted. We then split the total sample in half and conducted the exploratory factor analysis and confirmatory factor analysis using separate data sets. First, construct validity was tested by exploratory factor analysis using principal components analysis, which is the preferable extraction method. Varimax rotation was a common orthogonal method that was performed to simplify and clarify the data structure. This method was also used in a study by Weis and Schank[27] and in a study of the Chinese version of the revised Nurses Professional Values Scale.[28] Extracted factors with eigenvalues of >1 and items with a factor loading at only one factor larger than 0.50 were selected. Second, we used AMOS 20.0 for Windows (IBM Corp.) to perform the confirmatory factor analysis for evaluation of the fitness of our modified theory model. The fit indices were χ^2/df (<3), goodness of fit index (>0.90), adjusted goodness of fit index (>0.90), Tucker–Lewis index (>0.90), comparative fit index (>0.90), root mean square error of approximation (<0.08), and standardized root mean square residual (<0.08).[29] Third, the average variance extracted (AVE) was calculated to test the convergent validity. If the AVE was high (0.50), we considered the convergent validity suitable. Discriminant validity was determined by comparison of the factor's value of the square root of the AVE with the correlation of the specific factor with any of the other factors. If the square root of the AVE was larger than the correlation coefficient, the discriminant validity was accepted. The internal consistency reliability of the total questionnaire and each subscale was then assessed by Cronbach's α coefficient. A Cronbach's α coefficient of ≥ 0.70 was considered reliable.[26]

Results

Respondents

In total, 367 questionnaires were collected, 12 of which were eliminated because of an item nonresponse rate of $>10\%$ (i.e., >2 missing items). Finally, 355 valid samples were included in the analyses. The characteristics of these samples are shown in Table 1. The response rate was 91.75% ($n = 400$).

Construct validity

Exploratory factor analysis. In total, 177 samples were used for the exploratory factor analysis. The suitability of the data for factor analysis was tested by the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett's test of sphericity. The Kaiser–Meyer–Olkin value was 0.79 and Bartlett's test was statistically significant ($p < 0.001$), supporting suitability for factor analysis. Using exploratory factor analysis with varimax orthogonal rotation by principle component analysis, we deleted five items to refine the entire scale and subscales.[30] Q3 ("My fellow professionals have

Table 1. Characteristics of valid respondents (n = 355).

Category	Type	n	%
Age (y)	≤25	89	25.07
	26–34	197	55.49
	≥35	64	18.03
	Missing	5	1.41
Education level	Secondary diploma	42	11.83
	Advanced diploma	140	39.44
	Baccalaureate	172	48.45
	Higher than baccalaureate	1	0.28
Professional title	Assistant nurse	3	0.85
	Primary	289	81.40
	Middle	60	16.90
	Senior	3	0.85
Years of experience	≤3	97	27.32
	4–9	145	40.85
	≥10	111	31.27
	Missing	2	0.56
Membership in PO	Yes	53	14.93
	No or missing	302	85.07

PO: professional organization.

a pretty good idea about each other's competence") was not significantly associated with the total score of the subscale (Pearson relation coefficient r = 0.035). Q5 ("I make my own decisions in regard to what is to be done in my work"), Q16 ("The professional organization doesn't really do too much for the average member") and Q21 ("Although I would like to, I really don't read the journals too often") resulted in a significant increase in Cronbach's α coefficient after deleting its subscale. Q14 ("It is encouraging to see the high level of idealism which is maintained by the people in this field") was not suitable for Chinese nurses according to the cultural context, so it was deleted. However, Q19 ("Most people would stay in the profession even if their incomes were reduced") regarded nursing as a general profession, and Q8 ("A problem in this profession is that no one really knows what his colleagues are doing") referred to judgment of the professionalism of nurses' colleagues. Although the factor loadings of these two items were <0.50, we included them in Factor 1 and Factor 4, respectively. We analyzed the content of the included items and their similarity to the original five dimensions of Hall's model, labeling "Sense of calling to the field" as Factor 1, "Use of professional organizations as a reference" as Factor 2, "Autonomy" as Factor 3, "Belief in self-regulation" as Factor 4, and "Belief in public service" as Factor 5. These five factors explained 58.86% of the total variance of the items in the C-SR-HPIS. The detailed results are shown in Table 2.

Confirmatory factor analysis. In total, 178 samples were used for the confirmatory factor analysis. AMOS 20.0 for Windows (IBM Corp.) was used to report the results of the confirmatory factor analysis of our modified theory model. The values of the seven indicators are presented in Table 3. The χ^2/df was <3; the root mean square

Table 2. Exploratory factor analysis with varimax rotation.

Items	Factors				
	1	2	3	4	5
Q23: My colleagues pretty well know how well we all do in our work	0.84				
Q22: If ever an occupation is indispensable, it is this one	0.83				
Q24: There are very few people who don't really believe in their work	0.80				
Q9: The dedication of people in this field is most gratifying	0.62				
Q4: People in this profession have a real "calling" for their work	0.60				
Q7: I think that my profession, more than any other, is essential for society	0.60				
Q20: I am my own boss in almost every work-related situation	0.52				
Q19: Most people would stay in the profession even if their incomes were reduced	0.48				
Q11: I believe that the professional organization should be supported		0.81			
Q1: I systematically read the professional journals		0.69			
Q6: I regularly attend professional meetings at the local level		0.64			
Q25: Most of my decisions are reviewed by other people			0.86		
Q15: My own decisions are subject to review			0.82		
Q13: We really have no way of judging each other's competence				0.82	
Q18: There is not much opportunity to judge how another person does his work				0.74	
Q10: I don't have much opportunity to exercise my own decision				0.51	
Q8: A problem in this profession is that no one really knows what his colleagues are doing				0.39	
Q17: Some other occupations are actually more important to society than is mine					0.75
Q12: The importance of my profession is sometimes over-stressed					0.65
Q2: Other professions are actually more vital to society than mine					0.63
Eigenvalue	3.99	2.20	1.87	1.86	1.85
Variance (%)	19.97	10.98	9.36	9.32	9.23
Accumulated variance (%)	19.97	30.95	40.31	49.63	58.86

Extraction method: principle factor analysis.
Only factors with an eigenvalue of >1 are reported.
The total variance explained by five factors is 58.86%.

Table 3. Goodness of fit for the Chinese version of the Snizek-revised Hall's Professionalism Inventory Scale.

χ^2/df	GFI	AGFI	TLI	CFI	RMSEA	SRMR
1.61	0.88	0.85	0.89	0.90	0.06	0.08

χ^2, chi square; *df*, degrees of freedom; GFI, goodness of fit index; AGFI, adjusted goodness of fit; TLI, Tucker–Lewis Index; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

Table 4. Convergent validity and discriminant validity.

Factors	AVE	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	0.43	0.65				
Factor 2	0.46	0.73	0.68			
Factor 3	0.58	0.00	−0.23	0.76		
Factor 4	0.25	0.00	0.00	0.37	0.50	
Factor 5	0.36	0.00	0.00	−0.23	0.43	0.60

AVE, average variance extracted. On the diagonal, we inserted the square roots of every factor's AVE to compare it with the other correlation coefficients.

error of approximation and standardized root mean square residual were <0.08; the comparative fit index was 0.90; and the goodness of fit index, adjusted goodness of fit index, and Tucker–Lewis index were approximately 0.90. These values suggested good fitness of our modified theory model.

Convergent and discriminant validity

To test the convergent and discriminant validity, we calculated the AVE and square root of every AVE belonging to each latent factor. The outcome is presented in Table 4. Factor 1 and Factor 2 were conceptual cores and rapid advancement of the nursing profession, and both were highly related to the degree of nursing professionalism. The square root of the AVE of each factor was higher than the correlation of the specific factor with any of the other factors (except for Factor 1), indicating suitable discriminant validity.

Reliability

Table 5 shows the reliability of the internal consistency for the total scale and five factors. The items had a mean range of 2.50 to 4.10 and a standard deviation range of 0.77 to 1.09. The overall scale coefficient of internal consistency reliability was 0.76, which was larger than the minimum reliability standard of 0.70, and the five subscale coefficients were 0.85 ("Sense of calling to the field"), 0.72 ("Use of professional organizations as a reference"), 0.75 ("Autonomy"), 0.42 ("Belief in self-regulation"), and 0.58 ("Belief in public service").

Discussion

Reliability and validity are essential qualities of a good instrument. Our results show that the C-SR-HPIS is a reliable instrument for assessment of the professionalism of Chinese nurses. The number of items in the C-SR-HPIS is simplified to 20 without an obvious decrease in Cronbach's α

Table 5. Reliability of the Chinese version of the Snizek-Revised Hall's Professionalism Inventory Scale and factors.

Scale/Factors	Mean	SD	Cronbach's α
Overall scale	65.98	7.88	0.76
Factor 1: Sense of calling to the field	26.63	5.29	0.85
Q23: My colleagues pretty well know how well we all do in our work	3.35	0.90	
Q22: If ever an occupation is indispensable, it is this one	3.30	1.05	
Q24: There are very few people who don't really believe in their work	3.49	0.93	
Q9: The dedication of people in this field is most gratifying	3.71	0.89	
Q4: People in this profession have a real "calling" for their work	3.73	0.89	
Q7: I think that my profession, more than any other, is essential for society	3.52	0.95	
Q20: I am my own boss in almost every work-related situation	3.03	0.89	
Q19: Most people would stay in the profession even if their incomes were reduced	2.50	1.06	
Factor 2: Use of professional organizations as a reference	10.63	2.24	0.72
Q11: I believe that the professional organizations should be supported	4.10	0.82	
Q1: I systematically read the professional journals	3.24	0.99	
Q6: I regularly attend professional meetings at the local level	3.29	0.98	
Factor 3: Autonomy	5.56	1.90	0.75
Q25: Most of my decisions are reviewed by other people	2.88	1.09	
Q15: My own decisions are subject to review	2.68	1.04	
Factor 4: Belief in self-regulation	13.43	2.32	0.42
Q13: We really have no way of judging each other's competence	3.38	0.87	
Q18: There is not much opportunity to judge how another person does his work	3.08	0.89	
Q10: I don't have much opportunity to exercise my own decision	3.59	0.77	
Q8: A problem in this profession is that no one really knows what his colleagues are doing	3.38	0.91	
Factor 5: Belief in public service	9.74	1.94	0.58
Q17: Some other occupations are actually more important to society than is mine	2.86	0.90	
Q12: The importance of my profession is sometimes over-stressed	3.35	0.88	
Q2: Other professions are actually more vital to society than mine	3.53	0.85	

SD, standard deviation.

reliability, which is generally considered a proportional decrease due to fewer items. Compared with the original SR-HPIS, the 20-item C-SR-HPIS has acceptable reliability for the total scale and for three factors ("Sense of calling to the field," "Use of professional organizations as a reference," and "Autonomy") because these α

coefficients were >0.70. Two factors, namely "Belief in self-regulation" and "Belief in public service," showed a lower α coefficient. It is likely that these items are not sufficient to capture the factors of "Belief in self-regulation" and "Belief in public service" among Chinese nurses. Convergent validity refers to the degree of similarity of measurement results when different measurements are used to determine the same feature. The AVE for Factor 1, Factor 2, and Factor 3 was close to 0.50, while the AVE for Factor 4 and Factor 5 was <0.50. This may have been due to the low reliability of Factor 4 and Factor 5. Generally, the scale roughly converges to the conception of nursing professionalism. In terms of discriminant validity, it represents the irrelevance to other criteria. Good discriminant validity indicates that factors are distinguishable from one another. The square roots of the AVE of all factors were higher than the correlation of the specific factor with any of the other factors, except for Factor 1. In Factor 1, the square root of the AVE (0.65) was slightly lower than the largest correlation of the specific factor with any of the other factors (0.73). Taking the items in Factor 1 into account, we believe that this is still acceptable.

Like the SR-HPIS, the C-SR-HPIS is structured by five factors. The percentage of the total variance explained by the five factors of the C-SR-HPIS increased substantially from 36.38% to 58.86%. In comparison with the original SR-HPIS, five items are deleted in the Chinese version to refine the entire scale and subscales. In terms of content, Q3 ("My fellow professionals have a pretty good idea about each other's competence") does not have a significant relationship with the total score of the subscale. Moreover, considering the working environment of nurses in China, it is appropriate to delete Q3. The essence of nursing work in China is to execute physicians' orders. Q5 ("I make my own decisions in regard to what is to be done in my work") is opposite of the reality of Chinese nurses' work situation. Therefore, Q5 was deleted. Q14 ("It is encouraging to see the high level of idealism which is maintained by the people in this field") refers to the idealism of the entire nursing profession. It is not a sensitive or specific indicator at the individual level, however. Q16 ("The professional organization doesn't really do too much for the average member") refers to evaluation of administration authority. In China, practitioners are accustomed to concealing their negative opinions, if any, toward professional authority rather than criticizing it. Determination of most nurses' real attitudes toward their professional association may be difficult. Nurses working in secondary and tertiary hospitals of China are encouraged and evaluated by continuing study and research activity. The situation described by Q21 ("Although I would like to, I really don't read the journals too often") was rare among the nurses in our sample. Inefficiency in distinguishing the high and low levels may explain the deletion of Q21 for its irrelevance to the holistic level of nursing professionalism.

Furthermore, some items merged into different domains compared with the domains described in the original results, indicating that these five factors are held differently by nurses from various cultures (American versus Chinese nurses). Q7 ("I think that my profession, more than any other, is essential for society") and Q22 ("If ever an occupation is indispensable, it is this one") belong to Factor 5 in the SR-HPIS. However, our results show that these two items were included in Factor 1, with factor loadings of 0.60 and 0.83, respectively. Q7 and Q22 relate to the attitude toward the profession; therefore, we included them in the factor "Sense of calling to the field" according to cultural background.

Table 6. Comparison of psychometric properties of SR-HPIS and C-SR-HPIS.

Scale Factors	Items	Number of items	Cronbach's α	Variance (%)
SR-HPIS	–	25	0.78	36.28
Factor 1	Q4, Q9, Q14, Q19, Q24	5	0.58	7.13
Factor 2	Q1, Q6, Q11, Q16, Q21	5	0.62	3.07
Factor 3	Q5, Q10, Q15, Q20, Q25	5	0.74	9.10
Factor 4	Q3, Q8, Q13, Q18, Q23	5	0.70	8.93
Factor 5	Q2, Q7, Q12, Q17, Q22	5	0.64	8.06
C-SR-HPIS	–	20	0.76	58.86
Factor 1	Q4, Q7, Q9, Q19, Q20, Q22, Q23, Q24	8	0.85	19.97
Factor 2	Q1, Q6, Q11	3	0.72	10.98
Factor 3	Q15, Q25	2	0.75	9.36
Factor 4	Q8, Q10, Q13, Q18	4	0.42	9.32
Factor 5	Q2, Q12, Q17	3	0.58	9.23

SR-HPIS, Snizek-revised Hall's Professionalism Inventory Scale; C-SR-HPIS, Chinese version of the Snizek-revised Hall's Professionalism Inventory Scale.

Similarly, Q20 ("I am my own boss in almost every work-related situation") and Q23 ("My colleagues pretty well know how well we all do in our work") had a higher factor loading onto Factor 1, with factor loadings of 0.52 and 0.84, respectively. These items refer to nurses' dedication; hence, they were included in the factor "Sense of calling to the field." In the Chinese healthcare system, nurses must follow the doctors' orders according to the existing laws and decrees. Q10 ("I don't have much opportunity to exercise my own decision") is different from the items in Factor 3, which indicates that nurses make their own decisions without any external interference. Our results show that it is appropriate to include Q10 under the factor "Belief in self-regulation" in Chinese culture; its factor loading was 0.51. The details of the items included in the subscale are shown in Table 6.

As shown in Table 6, Factor 1 contained eight items primarily reflecting attitudes toward dedication and devotion to the nursing profession. We called this the "Sense of calling to the field," and it contributed most to professionalism, which can be explained by the basic social context and status of nursing in China. The nursing profession was founded with an emphasis on the cultivation of ethics and social responsibility and was developed in times of war as a "sacred" occupation to save lives and relieve pain.[24] Today, however, many experienced nurses are leaving the field, and young people are unwilling to choose nursing as a potential career in China.[31,32] Therefore, it stands to reason that the nurses in our sample who are continuing in this field have maintained a strong sense of devotion and commitment to the profession. This observation is concurrent with the findings reported by Lu et al.[33] that Chinese nurses demonstrate a high level of commitment to the nursing profession and are honored as "white angels" for their sacred devotion to human health, evidenced by their care of and respect for their patients. The other four factors explain the approximate values of variance. We analyzed the content of items and similarity in item composition compared with the original five dimensions of Hall's model, labeling "Use of professional organizations" as a reference as Factor 2, "Autonomy" as

Factor 3, "Belief in self-regulation" as Factor 4, and "Belief in public service" as Factor 5.

Clearly, Factor 2 ("Use of professional organizations as a reference") increased significantly in both reliability and explained variance (from 0.62 to 0.72 and from 3.07% to 10.98%, respectively). This factor is generally related to academic preparation. In recent years, some researchers have noticed a stronger foundation in knowledge and practice. In China, recruitment and training for a doctoral program in nursing as a first-class discipline began in 2011. The science of nursing knowledge is achieving high marks with the receipt of increased national and private funding support and academic activities. Thus, Factor 2 ("Use of professional organizations as a reference") plays a more important role in distinguishing how the profession of nursing is regarded. This is consistent with the notion proposed by Adams and Miller[34] that education in a university setting with a scientific background is critical for structuring professionalism in nursing.

Factor 3 ("Autonomy") comprised the fewest items, although it possessed high Cronbach's α reliability. Both Q15 and Q25 are included in the autonomy dimension of the original SR-HPIS. Autonomy refers to the capacity to which the practitioner feels free to make a decision about his or her work without pressure or threat from outsiders. China is the nation in which Confucianism originated, and the traditional core value of this belief system is that women obey and respect the elderly, men, parents, and authority. Asakura[35] reported that decreasing gender-stereotyped characteristics among Japanese nurses were required to promote nursing professionalism. Longstanding Chinese traditions and values make the development of autonomy more difficult in nursing, a female-predominant profession. In addition, Chinese nurses differ from nurses who practice in America and some European countries in that Chinese nurses are not legally permitted to perform medical interventions without physicians' orders. Instead, Chinese nurses deal primarily with executive coordination by checking physicians' orders and reviewing them in daily nursing work. This creates a vague sense and scope of autonomy that is difficult to capture. Therefore, Q15 ("My own decisions are subject to review") and Q25 ("Most of my decision is reviewed by other people"), which reflect the core features of autonomy,[36] comprise Factor 3, which we labeled "Autonomy."

Factor 4 is "Belief in self-regulation" and contains four items that mainly involve criticism and opinions from colleagues. It explained 9.32% of the variance. Given the state of specialized knowledge required in the nursing occupation, only colleagues, not "outsiders," are qualified to judge nurses' work. In these items, Q13 and Q18 originate from the "Belief in self-regulation" domain of the SR-HPIS. They are mainly related to the recognition of colleague control. Q10 ("I don't have much opportunity to exercise my own decision") is merged into this factor from the "Autonomy" domain, which may explain its lowest α reliability.

Factor 5 ("Belief in public service") comprises Q2, Q12, and Q17, explaining 9.23% of the variance. All of the items indicate the degree to which an individual's profession is essential, necessary, and useful for society. In that regard, a nurse must believe that his or her work is beneficial for himself or herself as well as for society. If the interests of the professional and society conflict, it is expected that professionals should sacrifice their benefit for the betterment of society.[37] However, it is difficult for individuals to realize the function and importance of a profession with respect to society. This may explain the low reliability value of

Factor 5, which was still slightly higher than that of Factor 4.

The existing data regarding Chinese nursing professionalism involve concept analysis and case reports. No applicable instrument by which Chinese nurses can measure their professionalism has been developed. Our study addressed this gap by devising an effective and reliable instrument that uses a quantitative method to measure the professionalism of Chinese nurses. The outcome of the C-SR-HPIS allows for assessment and analysis of the professionalism of nurses in China. The C-SR-HPIS can be used in further studies to help explore the differences and degrees of change in the relationships between nursing professionalism and potential factors.

This study has some limitations. First, the results should be generalized with caution because of the idiosyncrasies among the sample. Although the population of male nurses is extremely small in China, recruitment of some male nurses may be needed to ensure that the current sample is broadly representative. Second, we conducted a cross-sectional study to illustrate nursing professionalism. With the continued rapid development of Chinese society and reforms in the healthcare system and nursing education, other elements may emerge or become involved, such as new health or population policies, changes in perception, and the individual's desire for continued education to maintain competence, responsibility, and accountability for his or her own practice. Third, we designed the survey and recruited participants by departments, with minimal focus on some specialty groups of nurses such as nursing educators, nursing trainers, and senior nursing managers, who can offer insight into the nursing profession and may play a pivotal role in shaping and leading its current status and future trends. Fourth, test–retest reliability was not examined because two tests often cannot be performed by the same nurses due to their frequent rotations. In future research, we will undertake a longitudinal study to assess the level of and analyze changes in nursing professionalism to further validate our questionnaire. We will also include nurses with more diverse backgrounds to explore the differences in and influencing factors of nursing professionalism among specific groups to provide more evidence and reference for its development.

Conclusion

The findings of this study demonstrate that the C-SR-HPIS is a reliable and valid instrument with which to measure awareness of nursing professionalism in China and support its possible use in a diverse national setting. The C-SR-HPIS is suitable in the context of the Chinese social culture and health system for the exclusive investigation of nurses' attitudes toward professionalism in China.

Professionalism is an integral component of nursing. The C-SR-HPIS is a potentially useful instrument for investigators, educators, administrators, and practitioners to use in the exploration of factors influencing professional attitudes and their potential impact on nurses' behaviors. Use of the C-SR-HPIS can raise consciousness about the importance of professionalism and can enhance both the performance of nurses and the quality of care.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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