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ORIGINAL RESEARCH

Development and Validation of a Scale Measuring Humanistic Professional Awareness for Healthcare Students and Providers

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Objective: This study aimed to develop an appropriate scale accessing healthcare students' and providers' humanistic professional awareness (HPAS-HSP).

Methods: Following a literature review, stakeholder interviews, and panel discussions for item generation, 65 items for the HPAS-HSP scale were created based on a nine-point Likert scale, with 9 indicating "strongly agree" and 1 indicating "strongly disagree." A pilot study using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), with seven hundred twenty-five medical care students and providers in Taiwan as the total sample number of the study, was administered to examine the practicability of the HPAS-HSP scale. The statistics software SPSS and AMOS 24.0 were used to examine the psychometric properties of the scale, including internal consistency, convergent validities, discriminant validities, and exploratory and confirmatory factor analysis.

Results: The EFA resulted in 21 items in three factors, with 66.221% of the total variance explained: "personal integrity and accountability" (9 items; 51.763% of the variance explained), "sensitivity to others" (6 items; 8.667% of the variance explained), and "medical professional competence" (6 items; 5.791% of the variance explained). The Cronbach's alphas for the three subscales and the entire questionnaire ranged from 0.892 to 0.949. The CFA results yielded 20 items, with the same three factors, and demonstrated good model fit in the χ^2/df ratio (1.130; p = 0.140), CFI (0.998), TFI (0.998), and RMSEA (0.013). The composite alphas ranged between 0.900 and 0.969. Convergent and discriminant validity also confirmed the stability and consistency of the scale.

Conclusion: The statistical results demonstrated that the HPAS-HSP scale can be a measure to assess healthcare students' and providers' humanistic professional awareness.

Keywords: humanistic professional awareness, healthcare students and providers, scale development, psychometric properties

Introduction

An overreliance on technology for problem solving has led to simplifications and routinization in medicine and has also led to a lack of sufficient reflection upon the essential humanitarian or humanistic professional qualities that healthcare professionals should possess.[1] However, with the advance of patient-centered healthcare, a care focusing on not only physical comfort, but also the emotional well-being of patients and patient families,[2] people have grown concerned about the overreliance on medical technology, observing that it dehumanizes healthcare, resulting in

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patients, or even patient families, losing a personal connection with physicians and other healthcare professionals. Indeed, an awareness of patient empowerment has impelled healthcare professionals to refocus on humanism in medicine by addressing the spiritual and emotional needs of patients and patient families and, moreover, including them in healthcare decisions.[3]

Medical professionalism has been considered an essential foundation in medical education in order to optimize patients' health outcomes,[4] and humanitarian qualities are also essential in medical practice. Certain similarities are clearly shared between the medical humanities and the healthcare profession, as both focus on medicine. However, there is a difference between professionalism and humanism: those with professionalism but without humanism just pretend to care. Although the term "medical humanities" is difficult to define, the core concepts of medical humanities, such as altruism, skill, and duty, are connected to the three fundamental principles of professionalism in medical practice: the primacy of patient welfare, patient autonomy, and social justice.[5] In 1976, Moore,[6] an Austrian physician, coined the term "medical humanities" to define what "doctorship" is from social, cultural, philosophical, and other perspectives.[7] In order to restore humanity to the healthcare practice and allow students to reflect upon their roles as healthcare providers, medical humanities has become increasingly integrated into medical education.[8]

Coutts and Rogers[9] proposed the ABC mnemonic (altruism, beneficence, and compassion) to remind physicians that, as humanitarian medical and healthcare professionals, in order to care for their patients, they should possess the following humanistic professional qualities: respecting patients' viewpoints and opinions; attending to patients' psychological well-being; regarding patients as individual beings; treating patients in their social, physical, and family contexts; facilitating a strong patient–healthcare provider relationship through good communication and listening skills; engendering trust and confidence; and demonstrating warmth, compassion, and empathy. In essence, to practice holistic medicine, healthcare providers should not only care about a patient's body, but also their mind, spirit, and emotions.[10]

Macnaughton[11] declared that healthcare professionals should equip themselves with not only the knowledge of scientific medicine, but also the humanitarian qualities specific to medical care, which involves benevolence, compassion, courage, honesty, integrity, respect, and trust.[12,13] Chou et al[14] identified six attitudes for strengthening humanism:

humanity, curiosity, standard of behavior, acknowledging the importance to treat patients medically and humanistically, acting humanistically, and treating more than just the disease. According to Cohen,[15] professionalism refers to "a way of acting," entailing observable behaviors, while humanism refers to "a way of being," entailing personal commitment to others, especially those in need. Based on Cohen,[15] those with humanistic qualities share the following attributes: altruism, compassion, duty, integrity, and respect. Indeed, those who have humanitarian qualities also have more insight into human conditions, such as human illness and suffering; hence, they are willing to provide more insight into medical and healthcare professionalism and responsibilities to both their patients and themselves.[1] When patients are more satisfied with those possessing humanitarian and caring qualities, they will achieve better medical care outcomes.[16]

To instill authentic professionalism in healthcare practice, medical education should not only teach the expected professional behaviors, but also emphasize the cultivation of humanitarian values and attitudes. Hence, it is necessary to integrate humanism into healthcare professionalism in order to help students acquire correct humanistic behaviors and attitudes, thereby increasing their awareness of humanistic professionalism.[17,18] Although research has shown that humanism can be taught and acquired via healthcare education, with difficulties in assessing humanism in healthcare,[19] there is no specific or valid instrument which can be used to measure the humanistic professionalism in medical or healthcare education.[20,21] Hence, in order to assess the feasibility of integrating humanism into healthcare education to increase students' humanistic professionalism, there is a necessity to develop an assessment to measure healthcare students' humanistic professional awareness. Thus, in order to cultivate medical humanities within healthcare students, an instrument must be developed to measure healthcare students' and providers' humanistic professional awareness and to establish relevant curricula, programs, courses, or on-the-job training to sharpen their humanistic professional awareness. To that end, this study aimed to develop a humanistic professional awareness scale for healthcare students and providers.

Methodology
Procedure and Participants
In order to develop a feasible instrument measuring the awareness of humanistic professionalism, the intended Humanistic Professional Awareness Scale for Healthcare

Students and Providers (HPAS-HSP) was developed, mainly based on Slavec and Drnovšek[22] ten steps, divided into three phases (Phase 1, Steps 1–3; Phase 2, Steps 4–7; Phase 3, Steps 8–10). The ten steps were as follows: 1. a literature review and stakeholder interviews; 2. item pool generation; 3. an expert panel to confirm the content validity; 4. scale development and assessment; 5. scale translation into Mandarin Chinese and back-translation into English; 6. a pilot study; 7. sampling and data collection; 8. a dimensionality examination; 9. a reliability examination; and 10. a construct validity examination, including convergent validity and discriminant validity. The first phase (Steps 1–3) was associated with the theoretical framework and theoretical construction, the second phase (Steps 4–7) involved the representativeness and suitability of data collection, and the third phase (Steps 8–10) involved the statistical analysis and confirmation of the construct.

While conducting the research, the researchers followed the guidelines of the Research Ethics Framework of Society Institute in Taiwan.[23] In addition, the study was reviewed and approved by the Institutional Review Board of Chung Shan Medical University Hospital (No. CS18216). Prior to study commencement, the informed consent was obtained from the research subjects. Before the data collection, the nature and purpose of the study were explained. Anonymity and confidentiality of identities and information were also assured. In addition, identities were kept strictly confidential, and personal information was anonymously analyzed. The initial developed scale was reviewed through a pilot study, with a sample of seven hundred twenty-five randomly selected medical care students and providers in Taiwan.

Data Analysis

The study used both EFA (exploratory factor analysis) and CFA (confirmatory factor analysis) to analyze the data. The researchers first used EFA via SPSS (version 14.0)[24] to discover the underlying structure; the oblique rotation method was also used to minimize the number of factors.[25] To validate the internal consistency of the HPAS-HSP scale, the researchers further applied CFA, using AMOS 24.0[26] as a statistical method to examine the psychometric properties of the scale. In addition, the Kaiser-Meyer-Olkin (KMO) test (>0.6),[27,28] Bartlett's test of sphericity ($p < 0.05$),[29] Cronbach alphas (>0.7),[30] and goodness of fit indexes were used in the study. The goodness of fit indexes included χ^2/df ratio (<2),[31] comparative fit index (CFI; > 0.90),[32,33]

Tucker Lewis Index (TLI; > 0.90),[34,35] and root mean square error of approximation (RMSEA; <0.08).[36]

Results
Using Slavec and Drnovšek's Ten Steps to Develop the HPAS-HSP

As mentioned, the HPAS-HSP scale was developed, mainly based on Slavec and Drnovšek[22] ten steps, divided into three phases. In Phase 1, the researchers conducted an extensive literature review and stakeholder interviews (Step 1) and hence initially collected 112 scale items (Step 2). After three runs of expert panel discussions (Step 3), with experts in the social sciences, instrument development, statistics, and medical education, the 112 items were reduced to 65 items. In Phase 2, the panel made an agreement that the HPAS-HSP scale was rated on a nine-point Likert scale, with 9 meaning "strongly agree" and 1 meaning "strongly disagree" (Step 4). The higher the HPAS-HSP score, the stronger the humanistic professional awareness a participant had. Once the scale items were reduced to 65 items, these items, initially developed in English, were translated into Mandarin Chinese and then translated back into English to confirm its content validity (Step 5). Also, to examine the psychometric properties of the construct, the researchers conducted a pilot study (Step 6) on seven hundred twenty-five healthcare students and professionals in Taiwan as the representative samples (Step 7) for data collection and for generalization. In Phase 3, after data collection, the study used EFA and CFA to assess dimensionality (Step 8) and calculated Cronbach's alpha values to examine the internal consistency of the HPAS-HSP scale (Step 9). Moreover, convergent validities, discriminant validities, and goodness-of-fit indexes were also calculated to assess the construct validity (Step 10). The more specific description regarding Phase 3 is illustrated as below.

EFA Model for the HPAS-HSP Scale
Kaiser-Meyer-Olkin (KMO) Test and Bartlett's Test of Sphericity

Seven hundred twenty-five valid surveys were taken as a pilot study for data analysis. The study used the KMO test and Bartlett's test of sphericity to ensure sample adequacy and suitability of the data for factor analysis. Based on Kaiser,[27,28] KMO values below 0.50 are regarded as very poor, values between 0.50 and 0.59 are regarded as poor, 0.60–0.69 are regarded as average, 0.70–0.79 are considered good, 0.80–0.89 are considered very good, and 0.90–1.00
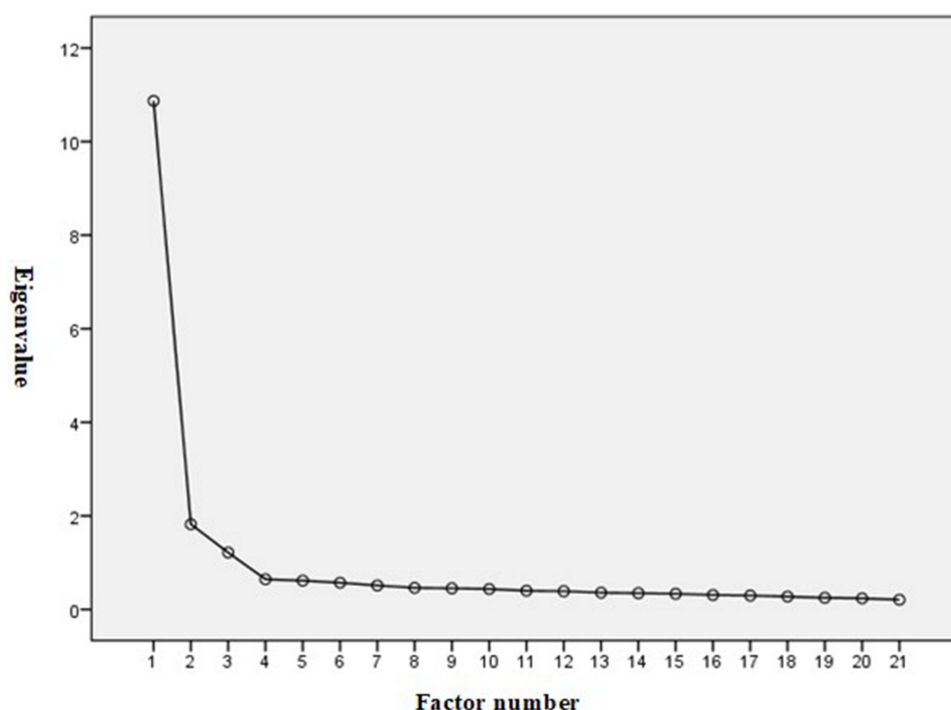
Figure 1 Principal component scree plot of HPAS-HP's factor structure.

are considered excellent. The KMO value derived in this study was 0.964, higher than the benchmark of 0.6.[27] Bartlett[29] test of sphericity was highly significant, with a p value less than 0.001 (approx.=10,387.101; degrees of freedom=210; p value = 0.000 < 0.05). The results of the KMO test and Bartlett's test proved the appropriateness of the sample size for EFA. The scree-plot for factor analysis of the HPAS-HSP also shows that optimum number of factors for the scale is three (see Figure 1).

EFA for Principal Component Analysis

EFA was adopted to examine the construct validity and internal consistency of the HPAS-HSP, using eigenvalues of 1.0 and principal component analysis with promax rotation. According to Hair et al,[30] factor loadings between the absolute values of ±0.30 and ±0.40 explain a variable at the minimum level. Factor loadings with an absolute value of ±0.50 or greater significantly explain a variable. Factor loadings greater than the absolute value of ±0.70 are regarded as a well-defined factor structure to explain a variable. In this study, an item was retained when its loading was higher than absolute values of ±0.70 for relevant factors and lower than that of 0.70 for nonrelevant factors (see Table 1).

As previously mentioned, after the panel discussions, the 112 items were reduced to 65 items for the HPAS-HSP; after EFA, by using promax rotation for principal component analysis, 21 items and three factors were identified, with 66.221% of the total variance explained: "personal integrity and accountability," "sensitivity to others," and "medical professional competence." Factor 1 contained 9 items related to "personal integrity and accountability" and accounted for 51.763% of the variance explained. A sample item for factor 1 is "Medical professionals should strive to protect the rights and privacy of research participants." Factor 2 contained 6 items related to "sensitivity to others," accounting for 8.667% of the variance. A sample item for factor 2 is "Medical professionals should devote themselves to listening to patients' illness stories and empathizing with theirs pain and emotional reactions." Factor 3 contained 6 items pertaining to "medical professional competence," explaining 5.791% of the variance. The following is a sample item:

> Medical professionals should be committed to continuous self-learning and professional development, demonstrating their lifelong learning ability to improve their medical competency.

All three factors from the principal component analysis have eigenvalues greater than 1: 10.870, 1.820, and 1.216 in "personal integrity and accountability," "sensitivity to others," and "medical professional competence," respectively (see Table 1).

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Table I Rotated Factor Loadings and Cronbach's Alphas for the HPAS-HSP

Item	Factor I: Personal Integrity and Accountability	Factor 2: Sensitivity to Others	Factor 3: Medical Professional Competence
Factor I: Personal Integrity and Accountability			
50	0.830		
59	0.803		
54	0.781		
43	0.744		
52	0.737		
49	0.736		
60	0.729		
55	0.727		
36	0.722		
Factor 2: Sensitivity to Others			
24		0.830	
29		0.806	
22		0.782	
28		0.778	
16		0.773	
20		0.749	
Factor 3: Medical Professional Competence			
I			0.825
5			0.818
4			0.761
6			0.742
3			0.741
2			0.735
Eigen value	10.870	1.820	1.216
% of variance	51.763	8.667	5.791

Note: Total variance explained is 66.221%.

Validity and Reliability Analysis of the EFA for the HPAS-HSP Scale

Initially developed in English, the scale was translated into Mandarin Chinese and then translated back into English; the two versions were reviewed and compared by bilingual teachers and experts to ensure content validity. Minor modifications were then made based on the reviewers' suggestions in order to avoid ambiguity of the item statements.

The researchers used Cronbach's alphas as a measure of internal consistency within each factor of the scale, taking 0.7 as the minimum criterion of reliability and 0.8 or greater as a better criterion.[37] The results showed that

the Cronbach's alpha values were 0.927, 0.892, and 0.904 for the three subscales "personal integrity and accountability," "sensitivity to others," and "medical professional competence," respectively; the Cronbach's alpha for the entire HPAS-HSP scale was 0.949, demonstrating that the subscales and the overall HPAS-HSP scale have excellent reliabilities in measuring healthcare students' and providers' humanistic professional awareness (see Table 1).

Scale Item Statements, Item Mean Scores, and Standard Deviations

The HPAS-HSP's scale item descriptions, item mean scores, and standard deviations are shown in Table 2.

CFA Model for the HPAS-HSP Scale

After the EFA was conducted, the 65 items in the HPAS-HSP scale were reduced to 21 items in three factors; also, the construct validity and the internal consistency were confirmed. Then, through CFA, the researchers confirmed the EFA model, using the same sample with which the EFA was conducted, using AMOS 24.[26] As in the EFA model, the CFA yielded the same three factors, but one item was deleted in factor 2 (Item 16: Medical professionals should demonstrate their willingness to make sacrifices and contributions toward the interests of patients and society) because its factor loading was below the benchmark of 0.70. Hence, the CFA model resulted in 20 items (see Appendix): "personal integrity and accountability" (9 items; factor loadings: 0.723–0.819), "sensitivity to others" (5 items; factor loadings: 0.764–0.900), and "medical professional competence" (6 items; factor loadings: 0.722–0.825). All factor loadings met the well-defined factor structure, whose benchmark value was greater than 0.70.[38] The three-factor CFA model for the twenty items is shown in Figure 2.

## Goodness of Fit of the CFA Model for the HPAS-HSP Scale

To further verify the goodness of fit of the CFA model, the study used a variety of indices to compare the EFA and CFA model, including a χ^2/df ratio, CFI, TLI, and RMSEA. According to Byrne,[31] to show an acceptable model fit, a χ^2/df ratio value should be less than 2, with p values > 0.05. Regarding the CFI, a CFI greater than 0.90 can be considered acceptable, and a CFI greater than 0.95 is considered excellent.[32,33] A TLI greater than 0.90 is regarded as an acceptable model fit, and a TLI greater than 0.95 is considered excellent.[34,35] An RMSEA index below

Table 2 Scale Item Statements, Item Mean Scores, and Standard Deviations of the EFA of the HPAS-HSP Scale

Scale Item Descriptions	Mean	S.D.
I. Personal Integrity and Accountability	73.321	7.632
50. Medical professionals should strive to reject any violation of any personal or healthcare guidelines.	8.13	1.095
59. Medical professionals should strive to protect the rights and privacy of research participants.	8.24	1.066
54. Medical professionals should strive to abide by strict medical ethics and moral principles.	8.13	1.061
43. Medical professionals should strive to keep patients' conditions and personal privacy confidential.	8.23	1.121
52. Medical professionals should strive to uphold the principles of social justice in the medical system and actively promote a fair distribution of limited medical resources.	8.07	1.079
49. Medical professionals should strive to inform patients about their conditions and treatment plans in detail and respect patients' autonomy.	8.16	1.058
60. Medical professionals should avoid wasting medical resources and unnecessary medical tests, so as to prevent patients from suffering avoidable injuries and expenses.	8.03	1.056
55. Medical staff should make full use of medical resources in order to provide patients with the most appropriate healthcare.	8.16	1.036
36. Medical professionals should strive to give patients clear explanations about their health status.	8.18	1.028
II. Sensitivity to Others	44.541	6.951
24. Medical professionals should devote themselves to listening to patients' illness stories and empathizing with their pain and emotional reactions.	7.47	1.426
29. Medical professionals should listen to patients' voices and respond to their concerns and preferences.	7.58	1.309
22. Medical professionals should strive to put themselves in their patients' position to experience their pain or reactions.	7.46	1.452
28. Medical professionals should show their understanding toward their patients, pay attention to them, and offer them sympathy.	7.60	1.328
16. Medical professionals should demonstrate their willingness to make sacrifices and contributions toward the interests of patients and society.	6.89	1.712
20. Medical professionals should show proper sympathy for patients' pain and anxiety and try to reduce their pain, anxiety, and discomfort.	7.53	1.359
III. Medical Professional Competence	48.330	5.660
1. Medical professionals should strive to provide patients with relevant medical information in order to help them reduce their pain and enhance their quality of life.	8.15	1.100
5. Medical professionals should demonstrate their ability to think critically and self-reflect.	7.94	1.191
4. Medical professionals should be committed to continuous self-learning and professional development, demonstrating their lifelong learning ability to improve their medical competency.	8.05	1.168
6. Medical professionals should strive to develop their communication skills in the medical field and demonstrate their ability to communicate with patients and related professionals to provide patients with the best medical care.	8.05	1.121
3. Medical professionals should strive to respect the privacy of patients and keep their medical conditions and personal information confidential under the constraints of the law.	8.36	1.045
2. Medical professionals should make efforts to reach a real understanding of patients' needs, experiences, beliefs, and feelings in order to provide patients with humanistic medical care.	7.78	1.252

Abbreviation: S.D., standard deviation.
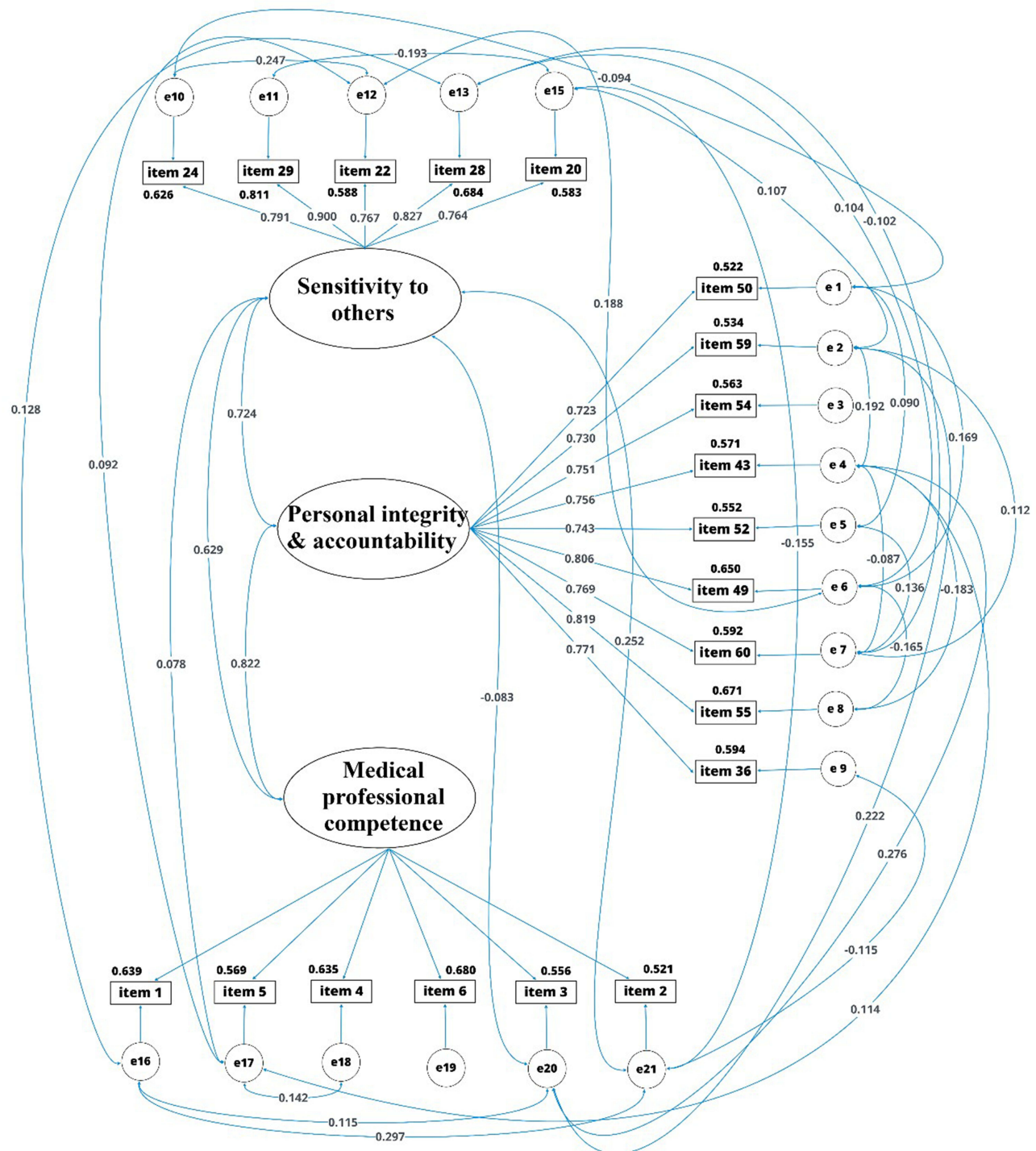
Figure 2 CFA for the HPAS-HSP scale.

0.08 is considered acceptable, and an RMSEA index below 0.05 is considered excellent.[36] As shown in Table 3, in the EFA model, the χ^2/df ratio is 3.474 (p = 0.000), CFI is 0.955, TLI is 0.950, RMSEA is 0.058, and CI for RMSEA is [0.054, 0.063]. The researchers later connected the two variables with high covariance and

modified the indices until all indices reached goodness of fit,[30–36] the CFA model is shown in Figure 2. Regarding the modification indices in the CFA model, as shown in Table 4, the χ^2/df ratio is 1.130 (p = 0.140; p > 0.05), CFI is 0.998, TLI is 0.998, RMSEA is 0.013, and CI for RMSEA is [0.000, 0.023].

Table 3 Goodness-of-Fit Indices for the EFA and CFA for the HPAS-HSP Scale

	χ^2/df	p	CFI	TLI	RMSEA	90% RMSEA CI
EFA	3.474	0.000	0.955	0.950	0.058	[0.054, 0.063]
CFA	1.130	0.140	0.998	0.998	0.013	[0.000, 0.023]
Improvement		$p > 0.05$	0.043	0.048	−0.045	

Note: n = 725.
Abbreviations: χ^2, Chi-square; df, degree of freedom; CFI, comparative fit index; TLI, Tucker Lewis index; RMSEA, root mean square error of approximation; CI, Confidential Index.

Table 4 Convergent Validities and Cronbach's Alphas: Examination of the CFA for the HPAS-HSP Scale

AVE and Composite Alpha Factor	AVE	Cronbach's Alpha	Composite Alpha
1. Personal Integrity and Accountability	0.583	0.927	0.926
2. Sensibility to Others	0.658	0.904	0.906
3. Medical Professional Competence	0.599	0.904	0.900

Reliability

For the CFA model, the Cronbach's alphas for the three subscales were 0.927 ("personal integrity and accountability"), 0.904 ("sensitivity to others"), and 0.904 ("medical professional competence"). The researchers further calculated composite reliabilities (see Table 4) to examine the scale's stability and internal consistency. The derived composite reliability coefficients were 0.926, 0.906, and 0.900, which are all higher than Hair et al[30] cutoff value of 0.70. Hence, the HPAS-HSP scale has proved its excellent reliabilities in assessing participants' humanistic professional awareness.

Convergent Validity

To examine the convergent validity of the scale, the AVE (average variance extracted) values of each factor were calculated and compared to its correlation with other factors, using composite reliability values.[30,39] Convergent validity would be determined if the AVE of the factor was at least 0.50 and smaller than its corresponding composite alpha values. The AVE values for the three subscales are, in fact, greater than 0.50 (see Table 4): 0.583 ("personal integrity and accountability"), 0.658 ("sensitivity to others"), and 0.599 ("medical professional competence"); the corresponding composite reliabilities are 0.926, 0.906, and 0.900, respectively. Considering that the AVE values of the subscales are not less than 0.50 and are smaller than the composite values,[30,39] the HPAS-HSP scale has demonstrated its convergent validity.

Discriminant Validity

To confirm the discriminant validity of the HPAS-HSP scale, the square root values of the AVE ($\sqrt{AVE}$) were calculated and compared to the corresponding Pearson's Correlation Coefficient (as Pearson's r) between factors.[40] Discriminant validity is demonstrated when the $\sqrt{AVE}$ of the factor is higher than its Pearson's r with other factors.[30,39] As shown in Table 5, the discriminant validity was proved between the factors of "personal integrity and accountability" and "sensitivity to others" ($\sqrt{AVE}$=0.764 and 0.811, respectively; r=0.664), "personal integrity and accountability" and "medical professional competence" ($\sqrt{AVE}$=0.764 and 0.774, respectively; r=0.748), and "sensitivity to others" and "medical professional competence" ($\sqrt{AVE}$=0.811 and 0.774, respectively; r= 0.604).

The results of the validities and reliabilities have demonstrated the feasibility of using the HPAS-HSP as a measure to assess healthcare students' and providers' humanistic professional awareness.

Discussion

This study intended to develop an instrument to measure humanistic professional awareness so that it could be used as a reference for forming relevant curricula, programs, courses, or on-the-job training to enhance humanistic professional awareness. Mainly based on Slavec and

Table 5 Discriminant Validities: Examination of the CFA for the HPAS-HSP Scale

Factor	1	2	3
1. Personal Integrity and Accountability	**0.764**		
2. Sensibility to Others	0.664**	**0.811**	
3. Medical Professional Competence	0.748**	0.604**	**0.774**

Notes: The values shown in bold are the square root of AVE ($\sqrt{AVE}$). **p<0.001.

Drnovšek[22] ten steps in three phases, after the literature review and interviews for item pool generation, the study called up expert panel discussion to screen out inappropriate items and classified the collected items into three categories as a priori hypothetical model, which were: "personal integrity and accountability," "sensitivity to others," and "medical professional competence." The content validity was confirmed through panel discussions.

While testing the psychometric properties of the HPAS-HSP scale, the researchers combined the techniques of EFA and CFA, using EFA to examine the latent variable structure of the dataset and then conducting CFA to verify whether the dataset was suitable for the model.[41,42] Initially, the panel sorted the collected items into three categories as an a priori hypothetical model. The researchers could have conducted the CFA alone; however, in order to validate the a priori hypothetical model, the researchers instead took a more conservative approach by conducting the EFA before the CFA.[41,42]

The application of EFA resulted in 21 items in three factors, explaining 66.221% of the variance: "personal integrity and accountability" (9 items), "sensitivity to others" (6 items), and "medical professional competence" (6 items). The subscale means showed that the respondents scored the highest on the "personal integrity and accountability" subscale (mean = 8.147; 73.321÷9 = 8.147), followed by "medical professional competence" (mean = 8.055). The participants scored the lowest on "sensitivity to others" (mean = 7.424). This subscale mean showed that these respondents think that medical professionals should strive to reject any violation of any personal or healthcare guidelines and also protect the rights and privacy of research participants. Also, they believe in striving to provide patients with relevant medical information in order to help them reduce their pain and improve their quality of life. Moreover, they support the necessity of demonstrating their ability to think critically and self-reflect. Relatively, compared to humanistic professional awareness in connection to "personal integrity and accountability" and "medical professional competence," these respondents focus less attention on "sensitivity to others"; for instance, they place less effort on listening to patients' voices and responding to their concerns and preferences. The EFA model revealed that the factor loading ranged from 0.722 to 0.830, all greater than the cutoff value, 0.70, of a well-defined factor structure, thus demonstrating evidence for the construct validity of the HPAS-HSP scale.[30] Also, Pearson's correlation coefficients (Pearson's r) of the HPAS-HSP scale all range between 0.604 and 0.748. According to Munro,[43] Pearson's r falling in the range between

0.00 and 0.25 indicates a very low correlation; a Pearson's r between 0.26 and 0.49 indicates a low correlation, a Pearson's r between 0.50 and 0.69 indicates a moderate correlation, a Pearson's r between 0.70 and 0.89 indicates a strong correlation, and a Pearson's r between 0.9 and 1.0 indicates a very strong correlation. Hence, the Pearson's correlation results derived in the study revealed a moderate and strong correlation between two related factors. The highest Pearson's r among the HPAS-HP scores was between "personal integrity and accountability" and "medical professional competence" (r = 0.748; p< 0.001), and the lowest correlation was between "sensitivity to others" and "medical professional competence" (r = 0.604; p< 0.001).

The researchers further used the CFA statistical technique, with AMOS 24.0, to examine the factorial validity of the EFA model for the HPAS-HSP scale.[44] After the CFA statistical analysis, one item, item 16 in "sensitivity to others," was deleted, resulting in a 20-item CFA model. The factor loadings for each item statement in the CFA model ranged between 0.722 and 0.900, indicating that the factor indicators in the model are adequate. The Cronbach's alphas and composite alphas also demonstrated good construct validity in terms of Hair et al criterion.[30] Compared with the HPAN measurement tool,[45] an instrument evaluating humanistic practice ability of nursing, whose Cronbach's alphas for the subscales of the HPAN ranged from 0.782–0.867, the Cronbach's alphas for the three subscales of the HPAS-HP were all above 0.90. Hence, the developed HPAS-HSP scale has demonstrated its better reliabilities in assessing participants' humanistic professional awareness. Using modification indices to examine the model's goodness of fit,[37] the varied fit indices, in terms of the χ^2/df ratio, CFI, TLI, and RMSEA, all demonstrated goodness of fit. The χ^2/df ratio value, with a value less than 2 and p values > 0.05, indicates an acceptable model fit.[31] The CFI index and TFI index, with values greater than 0.95, indicates an excellent model fit.[32–35] The RMSEA index, with a value less than 0.05, also demonstrates an excellent model fit.[36] Compared with the goodness-of-fit indices in the EFA model, the indices in the CFA model have proved to have better goodness of fit, with an increase of 0.043 and 0.048 in CFI and TLI, respectively, a decrease of 0.045 in RMSEA, and a decrease of 2.344 in the χ^2/df ratio value, with the p value becoming insignificant (p > 0.05; see Table 3).

The convergent validities were clearly established, in terms of Hair et al and Malhorta studies, with all of the AVE values of "personal integrity and accountability, "sensitivity to others," and "medical professional competence" greater than the benchmark value of 0.50 and less than the corresponding

composite values.[30,39] The discriminant validities were also established, in terms of Hair et al[30] and Fornell and Larcker criteria,[46] as all the √AVE values of the factor are higher than the correlation coefficients (*r*) with other factors between the factors of "personal integrity and accountability" and "sensitivity to others," "personal integrity and accountability" and "medical professional competence," and "sensitivity to others" and "medical professional competence."

The factor structure and the varied psychometric properties in assessment, in terms of internal consistency, convergent validities, discriminant validities, goodness-of-fit indices, and so on, demonstrate that the HPAS-HSP scale can be a valid instrument to assess humanistic professional awareness.

Conclusion

This study aimed to develop an instrument measuring healthcare students' and providers' humanistic professional awareness, in terms of Slavec and Drnovšek's ten steps and three phases in scale development and EFA and CFA statistical analysis. The study provided evidence that the HPAS-HSP scale has been proven to have a good factor construct, with good face validity and psychometric properties; hence, it has been proven to be an appropriate instrument in measuring students' and providers' humanistic professional awareness. Further studies may use the instrument to design relevant curricula, programs, courses, and on-the-job training to enhance healthcare students' and providers' humanistic professional awareness.

Acknowledgments

Disclosure

The authors declare no conflicts of interest for this work.

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