

The Knowledge, Efficacy, and Practices Instrument for Oral Health Providers: A Validity Study with Dental Students

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Abstract: Valid and reliable instruments to measure and assess cultural competence for oral health care providers are scarce in the literature, and most published scales have been contested due to a lack of item analysis and internal estimates of reliability. The purposes of this study were, first, to develop a standardized instrument to measure dental students' knowledge of diversity, skills in culturally competent patient-centered communication, and use of culture-centered practices in patient care and, second, to provide preliminary validity support for this instrument. The initial instrument used in this study was a thirty-six-item Likert-scale survey entitled the Knowledge, Efficacy, and Practices Instrument for Oral Health Providers (KEPI-OHP). This instrument is an adaption of an initially thirty-three-item version of the Multicultural Awareness, Knowledge, and Skills Scale-Counselor Edition (MAKSS-CE), a scale that assesses factors related to social justice, cultural differences among clients, and cross-cultural client management. After the authors conducted cognitive and expert interviews, focus groups, pilot testing, and item analysis, their initial instrument was reduced to twenty-eight items. The KEPI-OHP was then distributed to 916 dental students (response rate=48.6 percent) across the United States to measure its reliability and assess its validity. Both exploratory and confirmatory factor analyses were conducted to test the scale's validity. The modification of the survey into a sensible instrument with a relatively clear factor structure using factor analysis resulted in twenty items. A scree test suggested three expressive factors, which were retained for rotation. Bentler's comparative fit and Bentler and Bonnett's non-normed indices were 0.95 and 0.92, respectively. A three-factor solution, including efficacy of assessment, knowledge of diversity, and culture-centered practice subscales, comprised of twenty-items was identified. The KEPI-OHP was found to have reasonable internal consistency reliability to warrant its use for baseline and repeated measures in assessing changes in dental students' growth in cultural competence across four-year dental curricula.

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Keywords: patient-centered care, dental patients, access disparity, access to care, cultural competence, dental education

Submitted for publication 4/19/12; accepted 9/30/12

There is heightened need for ensuring that predoctoral dental students become culturally competent practitioners. The changing demographics in the United States with growing numbers of racial and ethnic minorities will place increased demand on health care practitioners to provide care to a patient population that is culturally diverse.¹ Furthermore, the recently revised Commission on Dental Accreditation (CODA) predoctoral accreditation standards require that graduates "be competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment."²

Ensuring that predoctoral dental students are culturally competent and capable of providing culture-centered patient care has obvious implica-

tions for curriculum revisions in academic dental institutions. First is the consideration of what type of revisions might be needed in didactic and clinical curricula. Second is thinking about how to give students multiple learning opportunities so that they develop the awareness and skills to manage diverse patient populations. Third is measuring student growth in the related competencies. Specific to the aim of our study, we describe here the development and validation of an assessment tool that can measure change in students' capability to provide effective cross-cultural, patient-centered communication. Without such a measure, it would be difficult to take curricular change initiatives seriously or sustain discussion about curriculum revisions.

Dental curricula must evolve to meet the needs of patients for whom future dentists will provide care. As the population of the United States increases, oral health care disparities are predicted to grow concurrently and have a cumulative impact on many individuals who are in racial and ethnic minority groups.¹ Health care disparities have been attributed primarily to many patients' limited access to prevention and treatment services.³ This problem is also significant because oral health is vital to the systemic health of individuals.^{1,4} Another contribution to this problem is the limited number of dental practitioners willing to treat those without financial means to carry dental insurance or pay for their own care. Increasing dental students' and professionals' competence in treating a wide range of patients from many cultures and with varying needs can help the nation to reduce oral health care disparities.

Dental schools that intend to incorporate cultural competence into their curricula may benefit from models developed in other health professions education. An approach used in nursing education included the following: increasing students' awareness of the complex cultural issues in health care systems, bridging the cultural divide between patient and practitioner, obtaining baseline assessment of current cultural competence, and providing culturally specific experiences.⁵ Researchers in medical education suggested three conceptual approaches to teaching cultural competence that focus on knowledge, attitudes, and skills.⁶ They described the aim of the knowledge program as providing information, definitions, common beliefs, and practices that are thought to influence patient-practitioner relationships and outcomes. Their attitude-based programs focus on improving "provider awareness of sociocultural factors on patients' values and behaviors and how these factors may impact treatment outcomes" (p. 1116). Their skill-building programs foster communication skills that elicit "a patient's exploratory model of illness and social context" and use liaisons to negotiate patient participation in decision making and treatment (p. 1116).

Ensuring that predoctoral dental students can provide both patient-centered communication and culturally competent practice is essential to effective patient-provider relationships. In this article, we review definitions of cultural competence and previous instruments that assess health professionals' cultural competence before describing the instrument we developed and tested in an attempt to establish its preliminary validity.

Defining Cultural Competence

The U.S. Department of Health and Human Services' Health Resources and Services Administration (HRSA) describes cultural competence as knowledge-based skills required to help practitioners provide effective clinical care to patients from various ethnic or racial groups.⁷ The National Center for Cultural Competence (NCCC) recommends that all health care organizations adopt values and principles aligned with behaviors, beliefs, and practices that enable health care providers to work effectively with cross-cultural patients.⁸ The NCCC points out that individuals need to develop an awareness of cultures unlike their own and that individuals and institutions should value cultural diversity, conduct self-assessments of individuals' knowledge base, understand the dynamics of difference, embrace diversity, and institutionalize a commitment to benefitting from the wisdom embedded in cross-cultural interactions.⁸

It is important for future dentists to understand that culture is historically constructed and is embedded within the sociopolitical context of the United States among the many cultures that share this country. Further, culture impacts perceptions of and attitudes toward health, both individually and collectively. Thus, it is important for all future health care providers to analyze how cultural perceptions shape their responses to the health care needs of ethnic and cultural groups unlike themselves.⁹ Like suggested measuring predoctoral students' baseline level of knowledge, efficacy, and practice beliefs at the beginning of their training and at interim points prior to completion of their program.¹⁰ Developing an instrument that aids in systematically measuring these constructs is essential to help health professions educational programs meet their mission.

Existing Instruments

Several instruments that assess cultural competence among health care students and practitioners have been described. Among these instruments are the NCCC's Cultural Competence Health Practitioner Assessment; the Cultural and Linguistic Competence Policy Assessment, designed to assist health care organizations in advancing and sustaining cultural and linguistic competence; the Tucker-Culturally Sensitive Health Care Inventory,¹¹ which assesses

medical students' level of commitment to providing patient-centered culturally sensitive health care; the inventory for assessing cultural competence among health care professionals in its revised form,¹² designed to measure practitioners' cultural competence; and the Multicultural Awareness, Knowledge, and Skills Scale-Counselor Edition, a scale that assesses factors related to social justice, cultural differences among clients, and cross-cultural client management. We reviewed these instruments to determine which of them might be appropriate for dental education.

The NCCC's Cultural Competence Health Practitioner Assessment (CCHPA) is designed to assess the delivery of high-quality services to culturally and linguistically diverse individuals and those whose health needs are underserved. Wagner and Redford-Badwal reported that the 2004 version of the CCHPA showed strong internal consistency, with Cronbach alphas ranging from 0.95 to 0.97 for each subscale.¹³ The CCHPA is comprised of six subscales: values and belief systems, cultural aspects of epidemiology, clinical decision making, life cycle events, cross-cultural communication, and empowerment/health management. Currently, there is no reported factor structure to support the creation of the scale. The CCHPA is an online self-assessment and awareness-building activity. The NCCC is in the process of creating a psychometrically sound, validated measure of the CCHPA.¹⁴

The Cultural and Linguistic Competence Policy Assessment (CLCPA) is designed to enhance health care utilization and promote cultural and linguistic competence essential to combat health disparities. The CLCPA gives an organization a snapshot of its cultural and linguistic competence at one point in time. While the assessment does not give a score, it allows an organization to examine its areas of strength and develop an action plan for improvement.¹⁴ The CLCPA is not intended to quantify individual levels of cultural and linguistic competence.

The Tucker-Culturally Sensitive Health Care Inventory (T-CSHCI-PF) gauges health care providers' levels of engagement in patient-centered, culturally sensitive health care behaviors and attitudes. In their study, Mirsu-Paun et al. describe the construction and factor analysis of 141 items that led to the final five-factor solution and fifty-three items.¹¹ The tool measures cultural sensitivity along five properties: patient-centeredness, interpersonal skills, disrespect/disempowerment, competence, and cultural knowledge/responsiveness. Two limitations of this study were its reliance on only one measure

of cultural competence and the use of a non-diverse sample of medical students.

The Inventory of Assessing the Process of Cultural Competence among Health Professionals (IAPCC-R)¹² is a twenty-five-item test that measures the level of cultural competence among health care professionals. Scores on its five constructs (desire, awareness, knowledge, skill, and encounters) range from 25 to 100 to indicate the participant's operational level of cultural proficiency: cultural competence, cultural awareness, or cultural incompetence. Higher scores are associated with higher levels of cultural proficiency. One of the limitations of the IAPCC-R is the lack of published research on its factor analysis and inter-item correlations. In one study of Swedish nursing students and practicing nurses (n=334), the IAPCC-R scale had low to moderate reliability, $\alpha=0.65$ for the total scale and α varying between -0.01 and 0.65 for the subscales in terms of its internal consistency.¹⁵ There was weak correspondence between the items and the underlying model. Those authors' exploratory factor analysis revealed eight factors rather than the originally proposed five factors, and a confirmatory factor analysis did not confirm the proposed structure of the instrument. In other studies, the IAPCC-R showed evidence of acceptable reliability^{16,17} and acceptable validity.¹⁸ However, a study conducted in Taiwan found weak reliability and a weak internal structure,¹⁹ while a U.S. study reported weak internal consistency and low item-total correlation.²⁰

Like other self-report scales, the T-CSHCI and IAPCC-R are subject to the limitations inherent to self-reporting. Neither scale reports efforts to decrease social desirability bias (SDB), which is when an individual selects a response considered favorable by society. This way of responding makes it difficult to determine the veracity of the findings.

The Multicultural Awareness, Knowledge, and Skills Scale-Counselor Edition (MAKSS-CE) was developed for counselor educators. The original thirty-three-item scale assessed factors related to social justice, cultural differences among clients, and cross-cultural client management. In their study, Kim et al. reported evidence of this scale's reliability and validity.²¹ An exploratory factor analysis (EFA) had resulted in the identification of thirty-three items. In the Kim et al. study and one by D'Andrea et al.,²² confirmatory factor analysis (CFA) confirmed the structure of the instrument and its subscales (multicultural awareness, knowledge, and skills) and ensured adequate construct validity. We used this

instrument while developing items for our study because of its strong psychometric properties and attention to potential social desirability bias.

Materials and Methods

Consistent with procedures used in instrument development, we conducted an extensive review of existing instruments in health care and counselor education that measure cultural competence. The first and second authors developed the initial scale, which was comprised of thirty-six items. We titled our instrument the Knowledge, Efficacy, and Practices Instrument for Oral Health Providers (KEPI-OHP). The procedures used for scale development were previously described.²³ After creating the initial set of items, we utilized expert reviews, cognitive interviews, and a focus group to improve item wording and to eliminate items that were unclear or redundant. We also conducted a pilot test to eliminate items with poor psychometric characteristics.

Expert reviews with dental faculty members (n=5) at the first author's institution were conducted to clarify the wording of items and remove those that were ambiguous. The expert panel members were also asked if they felt the items were representative of the issues related to providing oral health care to diverse populations. Following this step, we conducted a focus group with ten clinical dental faculty members. Cognitive interviews were used to verify whether the wording of the items was clear and consistent with the objective of the items.²⁴ The first author used the concurrent probing method for the respondents to read each question silently and then explain what they believed the question was asking. Focus group members were also asked to comment on whether the content of the items was consonant with the educational level of second-year dental students. We then used the group's feedback to modify the questions to enhance their clarity.²³

Pilot Test

After receiving Institutional Review Board (IRB) approval, we conducted pilot testing of the instrument using the envelope option with a convenience sample of second-year dental students at our institution. The study participants completed three questionnaires: the KEPI-OHP, Strahan and Gerbasi's short form X2 of the Marlowe-Crowne Social Desirability Scale (MCSDS),^{25,26} and a demographic sheet. This initial version of the KEPI was a thirty-six-item

instrument, using a four-point Likert scale, that was designed to assess the participants' self-report of cultural competence in knowledge, attitude, and skills. The MCSDS is a self-report, ten-item scale, requiring a true or false response, which ascertains whether responses are influenced by SDB: a falsification of responses in which an individual selects a response considered favorable by society.²⁷ The pilot test was conducted by distributing envelopes to the sixty-six students who attended a required didactic course presentation. Each envelope contained a cover letter and hard copy of the questionnaires, and participation was voluntary.

Forty-two students (64 percent) completed and returned the pilot survey. Eleven were omitted from further analysis due to high social desirability bias scores of 9 and 10 out of a possible 10 on the MCSDS, as recommended by Crowne and Marlowe.²⁶ Data from the remaining thirty-one surveys were inputted into an Excel spreadsheet. An exploratory factor analysis was run on the pilot data. There is no agreement about cut-off for removing items in factor analysis, although loadings for removing items have been reported as ranging from 0.20 to 0.40.²⁸ We chose a stricter level of 0.30, so item loadings with a correlation of less than 0.30 were removed. After we removed eight items, twenty-eight items remained to comprise the next version of the KEPI-OHP.

Validity Study

We then contacted the deans of thirteen dental schools whom the fourth author identified as potentially willing to have their institution participate in the validity study. Ten of the institutions contacted agreed to participate. In addition to obtaining IRB approval from the host institution, five of the ten participating dental schools required independent IRB approvals, which were also obtained. Sealed envelopes containing the questionnaires (the KEPI-OHP, the MCSDS, and a demographic survey), a cover letter, a \$1 incentive, and a self-addressed stamped return envelope were mailed to the potential participants at the ten schools. The incentive was a way of saying thank you to the participants for taking time to respond and because incentives have been reported to increase participation rates.²⁹

A designated faculty member at each institution distributed hard copies of the questionnaires to its entire class of second-year dental students. The questionnaires were distributed to a total of 916 students at ten schools, and 446 questionnaires were

returned for a response rate of 48.6 percent. However, after eliminating sixty-five questionnaires from the dataset due to levels of social desirability bias on the MCSDS²⁶ and those that were incomplete, a total of 381 were usable.

We randomly divided this sample into halves. One half (n=191) was used for the purpose of conducting an exploratory factor analysis (EFA), and the other half (n=190) was used for conducting a confirmatory factor analysis (CFA). The EFA was conducted to examine the internal structure of the scale and to identify items that could be deleted because they were redundant or had small factor loadings. The CFA was conducted to determine if the number of factors and the loadings of the measured variables supported the model developed using the EFA.

Results

Of the participating sample of 381 dental students, 193 were female (50.92 percent), 186 were male (49.08 percent), and two did not report gender. Age ranges for the participants were as follows: twenty to twenty-four years of age (n=235, 61.84 percent), twenty-five to twenty-nine (n=121, 31.84 percent), thirty to thirty-four (n=20, 5.26 percent), thirty-five to thirty-nine (n=3, 0.79 percent), and forty-five and over (n=1, 0.26 percent). One participant did not report age. The respondents reported their ethnicity as follows: white/European (n=240, 64.52 percent), black/African American (n=38, 10.22 percent), Asian American/Pacific Islander (n=53, 14.25 percent), Hispanic/Latino(a) (n=25, 6.72 percent), and unspecified (n=16, 4.30 percent). Nine participants (2.10 percent) did not report ethnicity. The respondents reported their family status as follows: single (n=295, 78.46 percent), married (n=76, 20.21 percent), and divorced (n=5, 1.33 percent); five (1.33 percent) did not report family status.

Factor analysis was conducted to modify the survey into a parsimonious instrument with a relatively clear factor structure. Seven items were deleted because the correlation with total was less than 0.20, and one item was removed due to high correlation with another item ($r=0.97$). The factor loading was set lower to preserve the variability in the raw data. We ran the EFA with twenty items using squared multiple correlations as prior commonality estimates. The principal factor method was used to extract the factors, followed by a promax (oblique) rotation.²⁸ When we interpreted the rotated factor pattern, an

item was said to load on a given factor if the factor loading was 0.20 or greater. A scree test suggested three meaningful factors, and only these factors were retained for rotation. The items in the questionnaire, corresponding factor loadings from the rotated factor pattern matrix, means, and standard deviations are shown in Table 1.

We ran a CFA using parceling on the second half of the data. Hatcher suggests using Bentler's Comparative Fit Index and Bentler and Bonnett's Nonnormed Index as measures of fit.³⁰ The analysis showed that Bentler's Comparative Fit Index was 0.95 and Bentler and Bonnett's Nonnormed Index was 0.92. We also explored the potential of significant differences due to exploratory variables (age, gender, race/ethnicity, and marital status). No significant differences were found.

We identified a three-factor solution comprised of twenty items. Factor 1, efficacy of assessment, has eight items; Factor 2, knowledge of diversity, has six items; and Factor 3, culture-centered practice, has six items. These twenty items comprise the final version of the KEPI-OHP.

Discussion

In this study, we examined the validity of the new KEPI-OHP, a twenty-item scale that measures the cultural competence of predoctoral dental students. The absence of a valid self-report cultural competency instrument for oral health care students prompted this investigation. A valid instrument for measuring cultural competence will provide reliable feedback to predoctoral dental and oral health care providers in general regarding their baseline cultural competence and will provide insight into areas where further development is needed.

We found that the KEPI-OHP has acceptable internal consistency reliability (0.87). The CFA fit indices showed a good fit for the full scale. These analyses showed that the correlated three-factor model provided a good fit with the data (Bentler's Comparative Fit Index was 0.95 and Bentler and Bonnett's Nonnormed Index was 0.92).

Findings from the use of this scale may be used to guide changes in dental curricula to ensure that the subject of cultural competence is covered with enough depth and consistency throughout students' programs to effect changes in their knowledge, efficacy, and practice-centered care. It may also be used for educators to evaluate the effectiveness of

Table 1. Factor pattern loadings by subscale, questionnaire items, means, and standard deviations

Efficacy of Assessment	Knowledge of Diversity	Culture-Centered Practice	Questionnaire Item	Mean	Standard Deviation
	0.29		How would you rate yourself in terms of understanding how your ethnic/cultural background has influenced the way you think and act?	3.22	0.60
		0.42	How would you rate your understanding of "patient management" for treating patients from ethnically/culturally diverse groups?	2.67	0.67
			At the present time, how would you rate your own understanding of the following term or phrase:		
	0.79		• Culture?	3.33	0.57
	0.81		• Ethnicity?	3.30	0.58
	0.82		• Racism?	3.44	0.58
		0.53	• Culturally Diverse Oral Healthcare Practices?	2.60	0.72
	0.79		• Prejudice?	3.30	0.58
	0.54		• Culturally Diverse Patients?	3.13	0.66
		0.75	• Pluralism?	2.25	0.85
		0.68	• Cultural Encapsulation?	2.18	0.82
0.30			In dentistry, patients from different ethnic/cultural groups should be given the same treatment.	3.10	.83
0.30			How well would you rate your ability to accurately identify your own culturally biased assumptions as they relate to your professional practice?	2.80	0.69
0.33			How would you rate your ability to effectively secure information and resources to better serve patients of different ethnic/cultural groups?	2.80	0.68
0.87			How would you rate your ability to accurately assess the oral health care needs of women?	3.19	0.70
0.87			How would you rate your ability to accurately assess the oral health care needs of men?	3.16	0.69
0.80			How would you rate your ability to accurately assess the oral health care needs of older adults?	2.96	0.68
0.79			How would you rate your ability to accurately assess the oral health care needs of gay men?	2.85	0.84
0.72			How well would you rate your ability to accurately assess the oral health care needs of patients with disabilities?	2.65	0.79
0.71			How well would you rate your ability to accurately assess the oral health care needs of persons who come from low socioeconomic backgrounds?	3.02	0.68
0.67			How would you rate your ability to identify your own strengths and weaknesses of oral health care treatment planning for persons from different ethnically/culturally diverse groups?	2.87	0.71

Note: Means and standard deviations are from the entire sample.

curricula in this area. As dental education continues to increase its emphasis on access to care, oral health care disparities, and the need to provide care to the dentally underserved and unserved, findings from the use of an empirical instrument may guide that process.

This study is relevant because of the changing demographics in the United States, coupled with the rising disparity in oral health care access and treatment for racial and ethnic groups. Andersen et al.³¹ reported that dental students from underrepresented minority groups are more inclined to serve patients

of their own race/ethnicity in clinical practice. However, this poses a conundrum because the majority of pre-health and health professionals in this country are white.²⁹ In order to increase access and equity in dentistry, white practitioners and those from high socioeconomic backgrounds need to have both an awareness of and the skills to communicate effectively with and treat racial/ethnic minority patients. Teaching these competencies in dental curricula can be assessed using appropriately and scientifically tested instruments.

This study has several limitations. Since we used a convenience sample of cohort groups (second-year students only) at ten schools, the external consistency was limited. The use of random sampling would have potentially increased the power of the findings and the generalizability of the scale. However, in this study, the logistics of trying to obtain an adequate sample size for both phases of the study took precedence. Also, we did not assess criterion validity because there is no comparable scale at this point in time.

The KEPI-OHP has significant advantages over the instruments described above. First, the twenty-item instrument can be completed more quickly than the fifty-three-item Tucker scale. Secondly, it is applicable to individual health care practitioners rather than organizations as with the CCPHA. Third, we have addressed the limitations inherent to self-report measures and SDB, unlike the Tucker scale and the IAPPC. Finally, unlike the other instruments described, our instrument is the only one known that at this time was specifically developed for oral health providers. The next step will be to make this instrument available to dental schools throughout the United States and Canada. As we continue to obtain more data, additional analyses will be undertaken to refine the instrument.

Acknowledgments

We wish to acknowledge support from Health Resources and Services Administration grant #1 D85HP20030-01-00. The contents of this article represent the authors' views only and not the agency's.

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