Published in final edited form as:

Res Social Adm Pharm. 2011 December ; 7(4): 330–337. doi:10.1016/j.sapharm.2010.08.003.

Development and Evaluation of an Instrument to Measure Community Pharmacists' Self-Efficacy Beliefs about Communicating with Spanish-Speaking Patients

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Abstract

Background—Hispanics are the largest growing population in the United States and their use of prescription medications can be influenced by the education and counseling they receive from pharmacists. However, little is known about pharmacists' communication with patients who speak Spanish or factors that can influence such communication.

Objectives—The objective of the study was to develop and validate an instrument to measure pharmacists' self-efficacy in communicating with Spanish-speaking patients.

Methods—An initial pool of 15 items developed from previous research and suggestions from communication experts and practicing pharmacists was subjected to cognitive interviewing. Nine retained items were administered to 1022 licensed pharmacists by mail survey. Summary statistics and exploratory factor analysis (EFA) were conducted. Retained factors were determined by the

examination of eigenvalues and Scree test results. Cronbach's alpha coefficients were calculated to assess internal consistency.

Results—A total of 540 community pharmacists completed the survey. Item means ranged from 2.93(SD=1.47) to 1.58(SD=0.88) based on a 5-point scale (1-not at all confident to 5-extremely confident). EFA resulted in a 2-factor solution, accounting for 71% of the variance. The 2 factors consisted of Health and Drug Information (alpha = 0.92) and Opening the Encounter (alpha = 0.75). The alpha for the overall scale was 0.88.

Conclusions—We found evidence to support the reliability and validity of an instrument to measure pharmacists' self-efficacy beliefs about communicating with Spanish-speaking patients in community practice. Practitioners and researchers may use this instrument to inform pharmacy education, pharmacy practice improvement, and research efforts around communicating with Spanish-speaking clients.

Keywords

Self-efficacy; Pharmacists; Communication; Spanish-speaking patients

Introduction

Hispanics are the largest growing population in the United States, and now account for 15 percent of the Nation's total population.¹ More than 1 in 10 U.S. residents speak Spanish.² Nearly half of Hispanic adults in the U.S. report that they speak English “less than very well.”³ In a primarily English-speaking health care system, Spanish-speaking patients may be marginalized and experience greater risks of negative health outcomes.⁴

Communication issues impact Spanish-speaking patients' use of prescription medications. Williams and colleagues reported that Spanish-speaking patients were more likely to have inadequate functional health literacy and to misread medication dosing instructions in comparison to English-speaking patients.² Young et al found that Spanish-speaking patients were more likely to receive less drug-related information and educational messages from pharmacists, compared to English-speaking Hispanic or Caucasian patients.⁵ In addition, Rand and Rhee found that Spanish-speaking patients were less likely to receive information about medication side effects than English-speaking patients.³ However, little research has explored factors that contribute to these communication issues.

Pharmacists are ideally positioned to help patients in their communities use medications safely and effectively. To improve patients' medications use and quality of life, the pharmacy profession has adopted an orientation towards the provision of patient care rather than solely focusing on the dispensation of medications.^{6, 7} Adequate communication between pharmacists and patients is a significant precursor for improved drug use and patient outcomes.⁸⁻¹¹ Pharmacists' ability to speak Spanish is an essential component of their capacity to communicate with Spanish-speaking patients. However, if pharmacists lack confidence in their ability to communicate with Spanish-speaking patients, then those patients may not receive these benefits from pharmacists' education and counseling (e.g., improved medication use and outcomes).^{12, 13}

Social cognitive theory (SCT) provides a framework for understanding how an individual's confidence in her/his ability to perform a task (i.e., *self-efficacy*) may affect an individual's behavior.¹⁴ SCT is based upon a model of reciprocal determinism in which behavior, personal factors (including cognition), and environmental factors operate as interactive determinants of each other (Perry, Baranowski, & Parcel, 1990; Bandura, 1986).^{14, 15} At different points in time, one determinant may exert a dominant influence over the others, allowing different stimuli to influence human thought, affect, and behavior in a variety of ways. One specific determinant, self-efficacy, is considered the most vital mediator between cognition and behavior.^{15, 16} Bandura defines self-efficacy as “people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (p.391).¹⁴

Bandura posits that “people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true” (p.2).¹⁷ Based upon this assertion, individuals' knowledge and skills or what they have previously accomplished are not always good predictors of subsequent actions because the beliefs they possess about their capabilities significantly affect the ways in which they will behave.¹⁸ Thus, pharmacists' Spanish-language knowledge and skills (i.e. ability to speak Spanish) will certainly play important roles in their consultations with Spanish-speaking patients, but their self-efficacy beliefs enable them to exercise a measure of control over their actions (i.e., what pharmacists think, believe, and feel will affect how they communicate).¹⁴ For example, when dispensing a prescription, a pharmacist may think that a patient does not want to completely discuss the patient's health concerns, may believe that she/he does not have enough information to address health concerns, or may feel they are too busy to properly greet a patient. All of these beliefs on the part of the pharmacist likely will impact whether they communicate with a patient and the length or quality of that communication.

Scant research has examined how community pharmacists communicate with patients who speak foreign languages or factors that influence this communication. To the best of our knowledge, no instrument exists to measure pharmacists' self-efficacy in communicating with Spanish-speaking patients.¹⁹ Researchers have developed instruments to measure pharmacists' self-efficacy about communicating with English-speaking patients. More specifically, these instruments assess pharmacists' self-efficacy regarding the performance of medication therapy management services and the provision of pharmaceutical advice for symptoms, complaints, or needs among patients in the pharmacy.^{20, 21} However, using these instruments to assess pharmacists' self-efficacy in communicating with Spanish-speaking patients may have little or no relevance to the contextual demands and circumstances of interactions with Spanish-speaking patients.²² Bandura suggests that scales of self-efficacy must be tailored to the particular situation or behavior of interest in order to have explanatory and predictive value.²²

The objective of the study was to develop and validate an instrument to measure Pharmacists' self-Efficacy in Communicating with Spanish-speaking patients (PECS). To examine the validity of the instrument, we hypothesized that pharmacists who were younger in age, self-identified as Hispanic, reported they possessed Spanish-speaking skills, or had prior experience with formal Spanish language coursework would have greater self-efficacy

in communicating with Spanish-speaking patients in comparison to those who did not possess such characteristics or skills.

Methods

Instrument Development

We operationally define self-efficacy in this study as a pharmacist's belief in her/his ability to communicate with a Spanish-speaking patient during the dispensation of a prescription medication. To assess pharmacists' self-efficacy, an initial pool of 15 items (i.e., survey questions) was developed based upon previous literature as well as suggestions from communication experts and practicing community pharmacists.²³⁻²⁵ Items were written to model the process of prescription medication dispensation. Researchers with expertise in health communication and patient-provider communication as well as 2 practicing pharmacists reviewed and edited all items. Each item was rated on a 5-point scale ranging from 1 (not at all confident) to 5 (extremely confident). The initial item pool was then pilot tested with 5 practicing community pharmacists; cognitive interviewing was conducted. During the interviews, pharmacists were asked to evaluate the items with regards to their "usual" interaction with Spanish-speaking patients. Based upon the pilot test, 2 items were revised because of wording issues. Six items were deleted from the initial item pool because of misinterpretation and confusion. The remaining 9 items addressed the following topic areas: greeting patients, Spanish language skills, the use of language-assistance services, assessment of patients' English proficiency, explanation of medication instructions, medication history, insurance information, side effects, and health risks. The 9 item instrument was included in a mail survey (Appendix).

Study Population & Procedure

We surveyed 1,022 pharmacists licensed and living in Wisconsin. We used two sampling procedures to target two samples of community pharmacists. The majority of Wisconsin's population is Caucasian and English-speaking. We sought to increase the likelihood of obtaining responses from pharmacists who have experience with caring for Spanish-speaking patients, thus potentially increasing the variability in responses to the items. We randomly selected 422 licensed pharmacies located within ethnically diverse zip codes in Wisconsin to ensure the inclusion of pharmacists practicing in diverse communities for the first sample. One survey was mailed to each of these pharmacy addresses; one staff pharmacist in each pharmacy was asked to complete the survey. For the second sample, a list of licensed pharmacists with home addresses in Wisconsin was obtained from the state licensing board. We randomly selected and mailed surveys to the home addresses of 600 pharmacists.

Data were collected from both samples in four waves from September to November 2008: wave 1) full mailing to selected respondents (cover letter, first class postage-paid return envelope, \$2 pre-incentive and survey); wave 2) postcard reminder; wave 3) full mailing (no incentive) to those respondents who had not returned their survey; and wave 4) full mailing (no incentive) to those respondents who had not returned their survey. Pharmacists who were retired or who worked in settings where ambulatory patients do not fill prescriptions

were excluded (n=179). Data from the two samples were pooled as no significant differences existed between the responses of individual pharmacists and the pharmacy-based samples on age, gender, ethnicity, or years of experience. This study was approved by the University of Wisconsin-Madison Institutional Review Board.

Data Analysis

We conducted descriptive statistics to characterize participants' responses to the self-efficacy items. To assess construct validity, we performed a principal-components exploratory factor analysis to determine the factor structure underlying pharmacists' self-efficacy in communicating with Spanish-speaking patients. We also performed an oblique rotation to determine which items loaded most highly on which factor. The method of oblique rotation was chosen because of the expected correlation between all underlying factors.²⁶ The number of factors to be retained was determined by using recommended criteria of cutoff eigenvalue at 1 and Scree test.^{27, 28} An item was associated with a specific factor if it had a factor loading greater than 0.4 for a specific factor.²⁹

The internal consistency (i.e., reliability) of the instrument was assessed by examining corrected item-total correlations and Cronbach's alpha coefficients. To examine criterion validity, we conducted bivariate analyses to evaluate the relationships between self-efficacy scores and participants' characteristics and skills. The survey included items to assess the respondent's age, ethnicity/race (Hispanic/Latino, other), Spanish-speaking skills (fluent, limited conversations, knowledge of a few common phrases, and none), and experience with formal Spanish coursework (yes, no). Analyses were conducted using STATA, SE 9.

Results

A total of 540 community pharmacists completed the survey and were included in the analysis sample. The majority of respondents were male (63%) and white (93%), and the average age of respondents was 47 years (SD=13.2) (Table 1). Respondents predominantly worked in chain (43%) and independent (20%) pharmacy settings. Approximately 1% of respondents (n=5) self-identified themselves as Hispanic or Latino. Forty-three percent of respondents reported that they spoke Spanish; of those, 72% only knew a few common phrases, 26% could carry on limited conversations, and 3% were fluent in Spanish. In addition, 46% of respondents reported that they took a course to learn Spanish.

Table 2 shows descriptive statistics for the items contained in the instrument to measure pharmacists' self-efficacy in communicating with Spanish-speaking patients. Responses to all items ranged from 1 to 5. Item mean scores ranged from 1.58 (SD=0.88) to 2.93 (SD=1.47). Participants were most confident in their ability to greet Spanish-speaking patients and use language-assistance services in their pharmacies to communicate with Spanish-speaking patients. Participants were least confident in their ability to talk to Spanish-speaking patients about potentially serious health risks and take medication histories from Spanish-speaking patients.

The principal component factor analysis revealed a two factor structure for the PECS instrument. Results showed that 2 factors had eigenvalues greater than 1, accounting for

71% of the variance (Table 3). Factors 1 and 2 accounted for 54% and 17% of the variance, respectively. The Scree plot provides additional evidence supporting this 2 factor structure (Figure 1). Factor 1, which was interpreted as “Health and Drug Information,” included 5 items after the oblique rotation. Items with the highest loadings on the “Health and Drug Information” factor were related to the discussion of health risks, medication history, and side effects. Factor 2, which was interpreted as “Opening the Encounter” included 4 items. The items with the highest loadings on the “Opening the Encounter” factor focus on greeting patients, Spanish-language ability, and assessing patients' proficiency with the English language. All 9-items were retained in the instrument. Table 4 contains the final 9-item, two-factor scale. The corrected item-total correlations ranged from 0.45 to 0.80. The Cronbach's alpha coefficient for the overall instrument was 0.88. The Health and Drug Information subscale had a Cronbach's alpha of 0.92 and the Opening the Encounter subscale had a Cronbach's alpha of 0.75. In addition, there was a significant positive correlation ($r=0.53$, $p<0.01$) between factors 1 and 2.

Analyses addressing criterion validity revealed significant differences in PECS scores across various respondent characteristics and skills, consistent with hypothesized relationships (Table 5). Specifically, younger respondents had a higher mean self-efficacy score in comparison to older respondents (2.40 vs 1.95; $p<0.01$). Respondents who self-identified as Hispanic or Latino had a higher mean self-efficacy score compared with respondents who self-identified with other ethnic/racial groups (3.87 vs 2.16; $p<0.01$). Respondents who reported that they could speak Spanish at any proficiency level had a higher mean self-efficacy compared with respondents who could not speak Spanish at all (2.55 vs 1.88; $p<0.01$). In addition, respondents who reported they took formal Spanish coursework had higher mean self-efficacy compared to respondents who had not taken any Spanish coursework (2.44 vs 1.95; $p<0.01$). The analyses addressing the criterion validity of the instrument also were conducted using each subscale score. The pattern of results using the subscale scores were identical to the results from the analyses conducted with the total scale score (results from the subscale analyses are available upon request).

Discussion

Overall, study results provided evidence to support the validity and reliability of the PECS instrument to measure pharmacists' self-efficacy in communicating with Spanish-speaking patients in community practice. The principal-components factor analysis, eigenvalues, and Scree test results supported a 2-factor structure. The first factor, Health and Drug Information, contains items related to the exchange of information vital for the safe and effective use of medications. The second factor, Opening the Encounter, contains items which relate to establishing the patient-pharmacist interaction. Moderate to high item-total correlations and Cronbach's alphas for the overall instrument and subscales (i.e., Opening the Encounter and Health and Drug Information factors) demonstrate good internal consistency reliability for the instrument.

We found substantial evidence for the criterion validity of the PECS in our assessment of the relationships between pharmacists' self-efficacy and their characteristics and skills. As expected, pharmacists who possessed Spanish-speaking skills had higher PECS scores. The

PECS score was further able to differentiate a dose-response relationship between the mean PECS scores and the four ratings of Spanish-speaking ability. As expected, pharmacists who reported being fluent in Spanish had the highest mean self-efficacy scores followed by those who reported an ability to carry on limited conversations and those who knew a few common phrases respectively. However, the number of pharmacists fluent in Spanish was quite small, suggesting potential problems in relying on these individuals to consistently meet the needs of Spanish-speaking pharmacy clients. This is particularly troubling in light of the extremely limited self-efficacy of pharmacists who did not speak any Spanish, who comprise the majority of community pharmacists.

In assessing criterion validity, we also discovered a trend that may suggest recent changes to pharmacy school curricula may, in fact, help bridge this gap in meeting the needs of Spanish-speaking patients. Specifically, younger pharmacists' had higher self-efficacy in communicating with Spanish-speaking patients, compared to older pharmacists. Given the growth of diverse patient populations, pharmacy schools are now educating students about the needs and intricacies of providing care to patients from different cultures.^{30, 31} This heightened awareness and exposure to multicultural issues and language barriers may raise younger pharmacists' confidence in dealing with these situations in practice.

The PECS instrument can be used in several ways to inform pharmacy education, pharmacy practice improvement, and research efforts around communicating with Spanish-speaking clients. First, in an attempt to bolster pharmacy students' communication skills, educators may seek to improve cognitive mechanisms that may impact the performance of culturally sensitive behaviors. During such training, the PECS could be useful in establishing a student's baseline self-efficacy and monitoring their progress on these critical skills. Second, pharmacy managers may use this instrument as an assessment tool to inform their staffing and to identify staff who may benefit from various supports for providing care to diverse patient populations. Third, the instrument could be used by researchers to support the investigation of factors that influence self-efficacy related to communicating with Spanish-speaking patients and the evaluation of interventions to improve pharmacists' communication with Spanish-speaking patients.

The limitations of this study should be considered. First, the majority of the participants in the study population were white (as is the case with the US pharmacist population). One might expect that pharmacists from diverse racial/ethnic backgrounds may have broader cross-cultural experiences which could result in improved self-efficacy in cross-cultural encounters. Second, the study was conducted in one state, so the generalizability to other geographic locales is not demonstrated. However, the demographics of Wisconsin community pharmacists are similar to those of our nation's community pharmacists. Nonetheless, future research could examine the utility of this instrument in other locations.

Conclusion

This study presents evidence to support the reliability and validity of the PECS instrument to measure pharmacists' self-efficacy beliefs about communicating with Spanish-speaking patients in community practice. The instrument consists of two factors "Opening the Encounter" and "Health and Drug Information," representing two main tasks of health care

encounters in pharmacy settings.³² This instrument offers researchers, educators, and pharmacy management an instrument to assess pharmacists' abilities in interacting with Spanish-speaking patients.

Appendix

Pharmacists' self-Efficacy in Communicating with Spanish-speaking patients (PECS) Instrument

1. Greet Spanish-speaking patients, for example by saying “Hola” or a similar Spanish-language greeting
2. Assess the English proficiency of Spanish-speaking patients who are new to your pharmacy
3. Speak Spanish at all
4. Use any language-assistance services in your pharmacy to help you talk to Spanish-speaking patients
5. Obtain information about their insurance from Spanish-speaking patients
6. Explain instructions for using medications to Spanish-speaking patients
7. Explain potential side effects of using medications to Spanish-speaking patients
8. Take medication histories from Spanish-speaking patients
9. Talk to Spanish-speaking patients about potentially serious health risks

References

1. Day, J. [Accessed June 18, 2009] Population profile of the United States. <http://www.census.gov/population/www/pop-profile/natproj.html>
2. Williams MV, Parker RM, Baker DW, et al. Inadequate functional health literacy among patients at two public hospitals. JAMA. Dec 6; 1995 274(21):1677–1682. [PubMed: 7474271]
3. David RA, Rhee M. The impact of language as a barrier to effective health care in an underserved urban Hispanic community. Mt Sinai J Med. Oct-Nov;1998 65(5-6):393–397. [PubMed: 9844369]
4. Wilson E, Chen AH, Grumbach K, Wang F, Fernandez A. Effects of limited English proficiency and physician language on health care comprehension. J Gen Intern Med. Sep; 2005 20(9):800–806. [PubMed: 16117746]
5. Young, HN.; Dilworth, TJ.; Mott, DA. Disparities in pharmacists' patient education for Hispanics using antidepressants; Annual Conference of the American Pharmacists Association; 2010.
6. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. Am J Hosp Pharm. Mar; 1990 47(3):533–543. [PubMed: 2316538]
7. Beney J, Bero LA, Bond C. Expanding the roles of outpatient pharmacists: effects on health services utilisation, costs, and patient outcomes. Cochrane Database Syst Rev. 2000; (3):CD000336. [PubMed: 10908471]
8. McKenney JM, Brown ED. Effect of pharmacist drug monitoring and patient education on hypertensive patients. Contemp Pharm Pract. 1978; 1:50–56.
9. Hammarlund ER, Ostrom JR, Kethley AJ. The effects of drug counseling and other educational strategies on drug utilization of the elderly. Med Care. Feb; 1985 23(2):165–170. [PubMed: 3974333]
10. Williford SL, Johnson DF. Impact of pharmacist counseling on medication knowledge and compliance. Mil Med. Nov; 1995 160(11):561–564. [PubMed: 8538891]

11. Yuan Y, Hay JW, McCombs JS. Effects of ambulatory-care pharmacist consultation on mortality and hospitalization. *Am J Manag Care*. Jan; 2003 9(1):45–56. [PubMed: 12549814]
12. Cranor CW, Bunting BA, Christensen DB. The Asheville Project: long-term clinical and economic outcomes of a community pharmacy diabetes care program. *J Am Pharm Assoc (Wash)*. Mar-Apr; 2003 43(2):173–184. [PubMed: 12688435]
13. Bunting BA, Cranor CW. The Asheville Project: long-term clinical, humanistic, and economic outcomes of a community-based medication therapy management program for asthma. *J Am Pharm Assoc* (2003). Mar-Apr;2006 46(2):133–147. [PubMed: 16602223]
14. Bandura, A. Social foundations of thought and action: a social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall; 1986.
15. Perry, CL.; Baranowski, T.; Parcel, GS. How individuals, environments, and health behavior interact: Social learning theory. In: Glanz, K.; Lewis, FM.; Rimer, BK., editors. *Health behavior and health education*. San Francisco, CA: Jossey-Bass; 1990. p. 161-186.
16. Bandura A. Self-efficacy mechanism in human agency. *Am Psychol*. 1982; 37:122–147.
17. Bandura, A. Self-efficacy: the exercise of control. New York, NY: Freeman; 1997.
18. Pajares, F. Current directions in self-efficacy research. In: Maehr, M.; Pintrich, PR., editors. *Advances in motivation and achievement*. Vol. 10. Greenwich, CT: JAI Press; 1997. p. 1-49.
19. Dilworth TJ, Mott D, Young H. Pharmacists' communication with Spanish-speaking patients: A review of the literature to establish an agenda for future research. *Res Social Adm Pharm*. Jun; 2009 5(2):108–120. [PubMed: 19524859]
20. Martin BA, Chui MA, Thorpe JM, Mott DA, Kreling DH. Development of a scale to measure pharmacists' self-efficacy in performing medication therapy management services. *Res Social Adm Pharm*. Jun; 6(2):155–161. [PubMed: 20511114]
21. Morken T, Fossum S, Horn AM, Granas AG. Self-efficacy in counseling in Norwegian chain pharmacies: A cross-sectional study. *Res Social Adm Pharm*. Dec; 2008 4(4):375–383. [PubMed: 19064244]
22. Bandura, A. Guide for constructing self-efficacy scales. In: Urban, T.; Pajares, F., editors. *Self-efficacy beliefs in adolescents*. Charlotte, NC: Information Age Publishing; 2006. p. 307-337.
23. Young HN, Lipowski EE, Cline RJ. Using social cognitive theory to explain consumers' behavioral intentions in response to direct-to-consumer prescription drug advertising. *Res Social Adm Pharm*. Jun; 2005 1(2):270–288. [PubMed: 17138478]
24. Puspitasari HP, Aslani P, Krass I. A review of counseling practices on prescription medicines in community pharmacies. *Res Social Adm Pharm*. Sep; 2009 5(3):197–210. [PubMed: 19733821]
25. Guirguis LM, Chewing BA. Development of a measure to assess pharmacy students' beliefs about monitoring chronic diseases. *Res Social Adm Pharm*. Dec; 2008 4(4):402–416. [PubMed: 19064246]
26. Pedhazur, E.; Schmelkin, L. *Measurement, design, and analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1991.
27. Kaiser KG. The application of electronic computers to factor analysis. *Educ Psychol Meas*. 1960; 20:141–151.
28. Cattell, RB. The meaning and strategic use of factor analysis. In: Cattell, RB., editor. *Handbook of multivariate experimental psychology*. Chicago, IL: Rand McNally; 1966. p. 174-243.
29. Stevens, J. *Applied multivariate statistics for the social sciences*. 3rd. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.; 1996.
30. Onyoni EM, Ives TJ. Assessing implementation of cultural competency content in the curricula of colleges of pharmacy in the United States and Canada. *Am J Pharm Educ*. 2007; 71(2)
31. Jungnickel PW, Kelley KW, Hammer DP, Haines ST, Marlowe KF. Addressing Competencies for the Future in the Professional Curriculum. *Am J Pharm Educ*. 2009; 73(8)
32. Bird J, Cohen-Cole SA. The three-function model of the medical interview. An educational device. *Adv Psychosom Med*. 1990; 20:65–88. [PubMed: 2239506]

Figure 1. Scree plot of eigenvalues

Table 1
Characteristics of Study Participants (N=540)

Variables	% or Mean(SD)
<i>Pharmacist-related</i>	
Age (years)	47.1 (13.2)
Gender (male)	63%
Ethnicity	
White	93%
Hispanic	1%
Years of Experience	23.5 (13.8)
Education	
Highest Degree - B.S.	72%
Highest Degree – PharmD	24%
Highest Degree – Other	4%
Spanish Language Skills	
Speak Spanish (at all)	43%
Only know a few common phrases	72%
Limited conversations	26%
Fluent Spanish	3%
Spanish Coursework (yes)	46%
<i>Pharmacy-related</i>	
Pharmacy type	
Chain	43%
Independent	20%
Mass Merchandiser	12%
Other	11%
Supermarket	7%
Hospital Outpatient	4%
Managed Care / HMO	2%
Number of prescriptions filled per day	371.6 (456.3)
Number of pharmacy staff	9.9 (10.1)

Table 2

Descriptive statistics for PECS instrument items

Item	Mean	SD	Min	Max
Greet Spanish-speaking patients, for example by saying “Hola” or a similar Spanish-language greeting	2.93	1.47	1.00	5.00
Use any language-assistance services in your pharmacy to help you talk to Spanish-speaking patients	2.69	1.29	1.00	5.00
Assess the English proficiency of Spanish-speaking patients who are new to your pharmacy	2.68	1.13	1.00	5.00
Explain instructions for using medications to Spanish-speaking patients	2.24	1.09	1.00	5.00
Obtain information about their insurance from Spanish-speaking patients	2.24	1.08	1.00	5.00
Explain potential side effects of using medications to Spanish-speaking patients	1.90	1.05	1.00	5.00
Speak Spanish at all	1.68	1.02	1.00	5.00
Talk to Spanish-speaking patients about potentially serious health risks	1.64	0.94	1.00	5.00
Take medication histories from Spanish-speaking patients	1.58	0.88	1.00	5.00

Note – 5-point scale: 1-not at all confident, 2-slightly confident, 3-somewhat confident, 4-very confident, 5-extremely confident

Table 3
Principal component factor analysis

Factor	Eigenvalue	Difference	Proportion
1	4.8329	3.3117	0.5370
2	1.5211	0.8625	0.1690
3	0.6587	0.0673	0.0732
4	0.5914	0.1383	0.0657
5	0.4532	0.0446	0.0504
6	0.4085	0.0985	0.0454
7	0.3100	0.1818	0.0344
8	0.1282	0.0323	0.0142
9	0.0960	.	0.0107

Table 4
Rotated (oblique) factor loadings for PECS instrument items

Item Abbreviation	Factor 1 Opening the Encounter	Factor 2 Health & Drug Information	Uniqueness
Greet Spanish-speaking patients	0.8917	-0.1434	0.2771
Speak Spanish at all	0.7269	0.0683	0.4309
Assess English proficiency	0.7012	0.1366	0.4201
Use language-assistance services	0.5471	0.2863	0.5050
Discuss health risks	-0.0924	0.9634	0.1280
Take medication history	-0.1078	0.9501	0.1602
Explain side effects	0.0461	0.9200	0.1208
Explain medication instructions	0.2640	0.7594	0.2080
Obtain insurance information	0.3534	0.5758	0.3959

Table 5
Criterion Validity - Mean PECS scores by pharmacist characteristics and skills

Variables	M	SD
Age Group ^a		
Younger (age <= 48)	2.40	0.81
Older	1.95	0.71
Hispanic/Latino Ethnicity ^a		
Yes	3.87	1.66
No	2.16	0.77
Spanish Language Skills ^a		
Speak Spanish (at all)	2.55	0.68
Fluent (n=6) ^b	4.59	0.69
Limited conversations (n=58) ^b	3.08	0.64
Only know a few common phrases (n=159) ^b	2.29	0.60
Not able to Speak Spanish	1.88	0.78
Spanish Coursework ^a		
Yes	2.44	0.78
No	1.95	0.74

Notes:

^a indicates significant differences based on t-tests ($p < 0.01$),

^b indicates significant differences based on ANOVA ($F = 85.51$, $p < 0.01$) and all group comparisons ($p < 0.01$)