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RESEARCH PAPER

Development of a Spanish version of the parent attitudes about childhood vaccines survey

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ABSTRACT

The Parent Attitudes about Childhood Vaccines (PACV) survey is a validated instrument for identifying vaccine-hesitant parents; however, a Spanish version is not available. Utilizing the WHO framework for translating survey instruments, we used an iterative process for developing the Spanish PACV that included forward translation, expert panel review, back translation and pre-testing that utilized cognitive interviewing. We made revisions to the Spanish PACV at each step, focusing on addressing inclusivity, readability, clarity and conceptual equivalence. The expert panel was comprised of 6 Spanish-speaking medical and research professionals who worked alongside 3 study team members. Pre-testing was conducted using convenience sampling of Spanish-speaking parents (N = 35) who had a child receiving care at the residents' continuity clinic at Texas Children's Hospital. Most pre-testing participants were married (80.6%), mothers (97.1%), ≥30 years of age (88.2%) and had a high school education or less (70.6%). While the majority of participants stated the survey was easy to complete, the translation of 5 PACV items was further revised to improve interpretability. We conclude that the final Spanish PACV is conceptually equivalent and culturally appropriate for most Hispanic populations.

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Introduction

Vaccine-hesitant parents (VHPs) are unsure about accepting vaccines and may subsequently delay or refuse one or more vaccines. However, VHPs tend to be more responsive to educational efforts and behavior change than staunch vaccine refusers. Identifying vaccine-hesitant parents is essential to providing timely and effective education to improve vaccination rates and prevent vaccine delay and/or refusal.[1-4]

The Parent Attitudes about Childhood Vaccines (PACV) survey is an instrument for identifying VHPs that was developed and validated in a U.S. English-speaking population by Opel et al.[4-7] It is self-administered, reads at a 6-7th grade level and consists of 15 items under 3 domains – behavior, vaccine safety and efficacy, and general vaccine attitudes.[6] Since its development, several studies have validated and utilized the PACV in the U.S.[5,8,9] Moreover, it has been translated and psychometrically tested in Italy and Malaysia and a short scale has been developed.[10-12]

A barrier to further use of the PACV in research on vaccine hesitancy is the lack of availability of a Spanish version. Overall, 57.5 million U.S. residents are of Hispanic origin and comprise the nation's largest ethnic minority. In 2016, 40 million U.S. residents 5 years of age and older spoke Spanish in their home.[13] The availability of a Spanish version of the PACV would help identify vaccine hesitancy in Spanish-speaking individuals. The objective of this study was to develop a culturally appropriate Spanish version of the PACV and its accompanying demographic items.

Results

Expert panel review of the forward- and back-translated Spanish PACV

The expert panel reviewed the first version of the forward-translated Spanish PACV and revised the title, 3 instrument instruction sentences, 11 of the 15 PACV items, 1 of the response options and 3 demographic questions. The title was changed from "*Actitudes de los Padres ante las Vacunas Infantiles*" to "*Actitudes de los Padres ante las Vacunas en los Niños*." All of the revisions addressed the 4 key areas of inclusivity, readability, clarity and conceptual equivalence (Table 1). For example, "*bebé*" was revised to "*hijo(a)*" in several PACV items and the "not sure" response category was changed from "*ni seguro ni inseguro*" to "*no sé*."

Additional revisions were made to two PACV items after review of the back translated version of the Spanish PACV. First, for the PACV item "Have you ever delayed having your child get a shot (not including seasonal flu or swine flu (H1N1) shots) for reasons other than illness or allergy?" the

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Supplemental data for this article can be accessed on the publisher's website.

Table 1. Spanish PACV revisions by key area.

Key Area of Revision:	Items Revised:	Example(s):* Initial translation	Final translation
Inclusivity	Title Instructions Questions 1–3, 8–12, 14,16–17, 20	"Actitudes de los Padres ante las Vacunas **Infantiles**"	"Actitudes de los Padres ante las Vacunas **en los Niños**"
		"¿Este **hijo** es su primer **bebé**?"	"¿Este **niño(a)** es su primer **hijo(a)**?"
		"Es mejor que mis **hijos** reciban menos vacunas al mismo tiempo."	"Creo que es mejor que el número de vacunas que **los niños** reciban a la vez sea menor."
Readability	Questions 3, 7, 8, 10, 12, 14	"Creo que muchas de las enfermedades que **previenen** las vacunas son graves."	"Creo que muchas de las enfermedades que **son prevenidas por** las vacunas son graves."
		"¿Qué tan preocupado está de que su hijo pudiera **experimentar** algún efecto secundario grave por una vacuna?"	"¿Qué tan preocupado está de que su hijo(a) pudiera **tener** algún efecto secundario grave por una vacuna?"
Clarity	Questions 4, 6, 8, 9, 11–13	"Los niños reciben más vacunas de las que son adecuadas para ellos."	"**Creo que** los niños reciben más vacunas de las que considero son necesarias para ellos."
Conceptual Equivalence	Questions 6, 7, 11, 13	"Creo que muchas de las enfermedades que previenen las vacunas son graves."	"Creo que muchas de las enfermedades que **son prevenidas por** las vacunas son graves."

*Item addressed highlighted in bold.

translation was changed from "*¿Alguna vez decidió retrasar la administración de alguna vacuna para su hijo(a) (sin incluir la vacuna antigripal) por motivos distintos a una enfermedad o alergia?*" to "*¿Alguna vez ha retrasado alguna vacuna para su hijo(a) (sin incluir la vacuna antigripal) por motivos distintos a una enfermedad o alergia?*" This change was intended to improve readability. Second, for the PACV item "How concerned are you that any of the childhood shots might not be safe?" the translation was changed from "*¿Qué tan preocupado está usted de que alguna de las vacunas en los niños pueda no ser segura?*" to "*¿Qué tan preocupado está usted de que alguna de las vacunas para los niños pueda no ser segura?*" to provide further clarity.

The back translation of another PACV item "*Los niños reciben más vacunas de las que son buenas para ellos*" ("Children get more shots than are good for them") was identified as potentially problematic because there is not a direct translation from English of the "more than are good for them" expression. The expert panel was unable to reach consensus on the best revision and decided to put forth 4 potential translations, including the translation that was used in the back translated version, to pre-test participants who identified the item as confusing or unclear in order to receive their input. The 4 translations of this PACV item presented to participants were as follows: 1) "*Los niños reciben más vacunas de las que son buenas para ellos;*" 2) "*Los niños reciben más vacunas de las que considero son necesarias para ellos;*" 3) "*Los niños reciben más vacunas de las que necesitan;*" or 4) "*Los niños reciben más vacunas que las que son buenas para ellos.*"

Pre-testing

We enrolled 35 participants for pre-testing of the third version of the Spanish PACV. The majority of the participants were married (80.6%), mothers (97.1%), ≥30 years of age (88.2%) and had a high school education or less (70.6%) (Table 2). The majority (N = 30) of participants stated the survey was easy to complete and understandable. There were 5 PACV items identified as difficult for a minority of participants to understand. The 5 items were: 1) "How sure are you that the following recommended shot schedule is a good idea for your child?" translated to "*¿Qué tan seguro está de que el seguir el esquema de vacunación recomendado es una buena idea para su hijo?;*" 2) "Children get more shots than are good for them" translated to "*Los niños reciben más vacunas de las que son buenas para ellos;*" 3) "I believe that many of the illnesses that shots prevent are severe" translated to "*Creo que muchas de las enfermedades que son prevenidas*

Table 2. Summary of participant characteristics.

Characteristic (N = 35)	N (%)
Age (years)	
18–29	4 (11.8)
≥30	30 (88.2)
Marital status	
Married	25 (80.6)
Single	2 (6.5)
Other	4 (12.9)
Parent type	
Mother	34 (97.1)
Father	1 (2.9)
Education	
High school/GED or less	24 (70.6)
Some college or less	4 (11.8)
4-year college degree	4 (11.8)
More than 4-year college degree	2 (5.9)
Household income	
≤$30,000	22 (71.0)
$30,001–50,000	8 (25.8)
$50,001–75,000	1 (3.2)
≥$75,001	0 (0.0)
# of children in household	
1	6 (18.8)
2	6 (18.8)
3	11 (34.4)
≥4	9 (28.1)
Race/ethnicity	
Hispanic or Latino	33 (97.1)
White	1 (2.9)
Black/African-American	0 (0)
Asian	0 (0)
Native Hawaiian/Pacific Islander	0 (0)
American Indian/Alaska Native	0 (0)
Other	0 (0)

*Due to rounding and missing responses, percentages may not add up to 100.

por las vacunas son graves;" 4) "It is better for my child to develop immunity by getting sick than to get a shot" translated to "*Es mejor que mi hijo(a) desarrolle inmunidad al enfermarse que a través de una vacuna;*" and 5) "It is better for children to get fewer vaccines at the same time" translated to "*Es mejor que los niños reciban menos vacunas al mismo tiempo*." In particular, several participants stated it was difficult to understand that they were being asked to indicate their level of agreement with the item statement. Also, 5 participants stated the response options were confusing or unclear. Several revisions were made to these items to provide additional clarity.

Lastly, for the statement "Children get more shots than are good for them," of the 31 participants surveyed, the version most preferred (N = 12) was "*Los niños reciben más vacunas de las que considero son necesarias para ellos*" followed by "*Los niños reciben más vacunas de las que necesitan* (N = 9). The most preferred version was incorporated into the final version of the Spanish PACV (Appendix).

Discussion

To our knowledge, this is the first study to translate the PACV survey to Spanish. Other vaccine hesitancy instruments have been developed in Spanish, such as the Vaccine Hesitancy Scale (VHS). This instrument incorporated multiple key elements of the PACV but was intended to have global application in low-and middle-income countries.[14] Future studies among the U.S. Hispanic population are needed to examine which instrument more effectively identifies vaccine-hesitant Spanish-speaking parents.

In our process of translating the PACV, we found the WHO framework to be essential to ensuring a robust translation of the English PACV. While the first version of the Spanish PACV after forward translation was generally accurate and comprehensive, ultimately, it was too literal and formal. Review by the expert panel and study team provided needed context for the survey questions, guidance related to the nuances of the Spanish language, and alternate idiomatic expressions more commonly used among native Spanish-speakers. The back translation identified additional inconsistencies and readability issues, particularly in regards to the PACV item "Children get more shots than are good for them" which was ultimately translated to "*Creo que los niños reciben más vacunas de las que considero son necesarias para ellos*." The inability of the expert panel to reach consensus on the best revision for this question highlighted the inherent difficulties in translating English expressions into Spanish.

Of note, several participants reported difficulty in understanding scaled response options that asked them to assess their level of agreement with a factual statement. Interestingly, several studies previously reported poor understanding of Likert scales across cultures, including in the Hispanic population and particularly among those with lower levels of educational achievement.[15-18] Moreover, concerns about the use of the Likert scale also arose in field-testing of the VHS in Guatemala.[19] This is consistent with our finding that the PACV items assessing parental level of agreement were often confusing and misunderstood by participants. The expert panel modified several questions to improve understanding of these items. Future studies should examine various response scale formats to determine if alternate formats are more conducive to different cultural groups.

Additionally, the majority of our pre-test participants reported a high school education or less; this is consistent with recent U.S. Census Bureau data.[20] The difficulties our participants reported regarding the Spanish PACV and the response options may be attributable to the educational disparity that affects some U.S. Hispanics. However, limitations related to comprehension and lack of familiarity with the structure of survey questions and response scales may also play a role.

Our study had several important limitations. First, we did not assess the reliability and validity of the Spanish PACV. This testing was outside the scope of this project. However, the results from our expert panel review and pilot test offer evidence of the face validity of the Spanish PACV. Regardless, further psychometric assessment of the Spanish PACV is necessary. Second, our Spanish-speaking expert panel and study participants primarily originate from Mexico, Central America and South America. Although the expert panel did not represent the Spanish-speaking geographic regions of Spain and the Caribbean, it is representative of the diverse Hispanic population in the U.S. Moreover, as the Spanish language varies regionally, particularly between Latin America and Europe, different versions of the Spanish PACV may be necessary for global application. Third, given that our study population reported lower socioeconomic status, our results may not be generalizable to other populations with higher education and income levels. Fourth, each of the expert panel and study team members had at least a college education and the panel did not include a lay Spanish-speaker. As such, our expert panel and study team were not representative of our participant population. Fifth, it is worth noting that the PACV was initially developed for English-speaking Americans and includes content domains and survey items specific to this population. While outside the scope of this study, further research examining vaccine hesitancy among Spanish-speaking Americans may be warranted as the content domains and survey items of the English PACV may not be generalizable to a Spanish-speaking population. Finally, convenience sampling of participants may have resulted in response bias; however, there is no reason to believe that our population would differ greatly from those who were not enrolled.

In conclusion, we developed a Spanish PACV that is appropriate for the cultural and educational needs of most Hispanic populations in the U.S., and it may have transferability to other populations in Central and South America. Future studies are needed to validate the Spanish PACV and assess its reliability.

Methods

We utilized the World Health Organization (WHO) framework for translating and adapting survey instruments.[21] The process consisted of four sequential steps: forward translation, expert panel review, back translation, and pre-testing/cognitive interviewing. This study was conducted at Texas

Children's Hospital (TCH) in Houston, TX and approved by the Baylor College of Medicine Institutional Review Board.

Step 1: forward translation

The forward translation of the PACV from English to Spanish was independently conducted by a certified Spanish translator in the TCH Language Services Department who had no prior knowledge of the PACV. The forward translation focused on creating a direct linguistic equivalent of the PACV to Spanish. The forward translation resulted in the first version of the Spanish PACV.

Step 2: expert review

Following the completion of the forward translation, an expert panel was convened to review the first version of the Spanish PACV. The expert panel consisted of 6 bilingual members, 4 of whom were native Spanish speakers. The expert panel included 4 board-certified pediatricians (1 general pediatrician, 2 pediatric infectious disease specialists and 1 pulmonary fellow), 1 registered nurse and 1 research assistant from TCH and Baylor College of Medicine. Each expert panel member was a fluent Spanish-speaker and had either interest or expertise in vaccines and/or vaccine hesitancy. Three panel members were born in Spanish-speaking countries (Mexico, Guatemala, and Panama) and two of these members completed medical school in their country of birth.

The expert panel worked in conjunction with the study team – 3 members including 2 board-certified general pediatricians (one of whom developed the PACV) and a public health professional. The expert panel reviewed the first version of the Spanish PACV and focused revisions on four key areas: inclusivity, readability, clarity and conceptual equivalence. Inclusivity was addressed by broadening language and reducing references to a specific gender and/or age. Readability was addressed by focusing on syntax errors, language formality (e.g. substituting formal Spanish phrases for more colloquial expressions and phrases), and inappropriate reading levels. Clarity and conceptual equivalence were a focus to ensure that the understandability and original intent of the PACV questions were maintained. The expert panel identified translation issues by reviewing each item of the first version of the Spanish PACV systematically and utilizing consensus building with the study team to resolve issues and concerns. By the conclusion of the expert panel meeting, a second version of the Spanish PACV was developed.

Step 3: back translation

The second version of the Spanish PACV was subsequently back translated to English by a certified Spanish translator in the TCH Language Services Department. The translation was completed by a different translator from Step 1; the individual had no prior knowledge of the instrument. Subsequently, the expert panel and study team re-convened and reviewed the back translated version of the Spanish PACV to confirm conceptual equivalence of this version to the English PACV. In this process, the expert panel identified and resolved discrepancies, inconsistencies and unclear concepts in the translation and resolved such issues through consensus building. By the conclusion of the second expert panel meeting, a third version of the Spanish PACV was developed.

Step 4: pre-testing and cognitive interviewing

The third version of the Spanish PACV was pre-tested with a convenience sample of Spanish-speaking parents seen at the residents' continuity clinic at Texas Children's Hospital, a predominately publicly insured population (82% Medicaid). Pilot participants were eligible if they were the parent of a child who sought care at the continuity clinic during the study period, were ≥ 18 years of age, and Spanish was documented in their hospital electronic medical record as their preferred language. Potential participants were identified using the clinic's daily schedule. An expert panel member (bilingual registered nurse) approached parents in the waiting room following appointment check-in from July 2016 to December 2016 and confirmed they were Spanish-speaking. All participants provided written informed consent. Participants completed the 3rd version of the Spanish PACV and then participated in a brief cognitive interview conducted by the same expert panel member using a cognitive interview guide adapted from a previous study (Table 3).[22] The interviewer queried the participant regarding usability and understandability. Usability was assessed by obtaining participant feedback on length of the survey, general ease in its completion and wording of questions. Understandability was assessed using "think-alouds" to assess whether participants understood the item as intended. Participants were also asked about words or expressions they did not understand, found unacceptable or offensive. Additionally, when alternate words or expressions existed, the participant was asked to choose which of the alternatives they preferred. Specifically,

Pre-test results were descriptively summarized by the expert panel member who conducted the cognitive interviews. The results were reviewed by the expert panel and study team. Based on pre-testing results, further revisions to the third version of the Spanish PACV were made. By the conclusion of the third expert panel meeting, a fourth and final version of the Spanish PACV was developed.

Table 3. Cognitive interview guide.

General Face Validity and Usability
Was the survey easy for you to fill out?
General Comprehension
What did you understand by the instructions at the start of the survey?
Did any questions contain words or expressions you found uncomfortable or offensive?
What questions were unclear or difficult to understand? Which should be reworded?
Think – aloud's
How did you go about answering this question?
Probe: Tell what you are thinking?
Probe: How easy or difficult did you find this question to answer?
Think – aloud's
Could this question be worded any better? If yes, how?
Think – aloud's
Tell me what you understand these responses to mean.
Did these responses make sense for this question?

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Disclosure of potential conflicts of interest

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