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Measuring Primary Care for Children of Latino Farmworkers: Reliability and Validity of the Parent's Perceptions of Primary Care Measure (P3C)

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This study evaluates the feasibility, reliability, and validity of the Parent's Perceptions of Primary Care measure (P3C) in an underserved population: children of Latino farm workers. Bilingual research assistants verbally administered the P3C, as well as a measure of child health-related quality of life (HRQL: the PedsQL™ 4.0) and demographic questions to 297 Latino farm worker parents of young children, in San Diego and Imperial Counties. The P3C was found to be feasible, as measured by a very low percent of missing/do not know values. Internal consistency reliability for the Total Scale and most subscales was strong. The P3C's validity was demonstrated through factor analysis of the subscales, by showing that scores were lower for children without a regular physician and for children experiencing foregone health care, and by demonstrating that P3C scores were related to HRQL. The P3C can be useful to various stakeholders in measuring primary care for vulnerable populations.

KEY WORDS: primary care; quality; Latino; child; measurement; migrant worker.

High-quality pediatric primary care is a cornerstone of efforts to improve access to care, control health care spending, and improve health outcomes (1–3), especially in vulnerable populations (4). Unfortunately, disparities in access to and quality of care exist across groups defined by socioeconomic status (5–7), and race/ethnicity (8–12). To spur both accountability and improvement (13) in primary care delivery, a reliable and valid measure of primary care quality is necessary.

One way to measure primary care quality is *via* parent's reports of their child's primary care experiences. Parents are in a unique position to

report on the care their children receive (14–17). Indeed, some aspects of primary care (for example, accessibility, adequate communication, and contextual care) describe the parent's/patient's experience of care, rather than a specific provider behavior. Other aspects of care can be reliably reported by parents (for example longitudinal continuity, comprehensiveness).

An existing parent-report measure of children's primary care experience is the Parent's Perceptions of Primary Care measure (P3C) (18). It is a brief (23-item), self-administered measure that elicits parents' reports of those characteristics of their child's primary care experiences that, when present, denote high-quality primary care (19). The P3C has been shown to be feasible, reliable and valid in a general community sample (18). Given its demonstrated reliability and validity in a general pediatric population, the P3C might also be useful for measuring and improving the quality of primary care provided to vulnerable children such as those of Latino farm workers.

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Children of farm workers, especially migrant farm workers, are particularly vulnerable to poor health outcomes (20). These children may live in families that are highly transient and may face substandard living conditions (21). They are likely to experience high rates of physical (22), mental (23, 24), and oral health conditions (25, 26). And children of Latino farm workers face multiple financial, cultural, and linguistic barriers to quality health care (22, 27–31).

Given the special vulnerability of this population, there is a pressing need for a brief, feasible, reliable, and valid measure of primary care characteristics for these children. Accordingly, the present study examines the psychometric properties of the P3C in children of Latino farm workers.

We assessed the feasibility, reliability, and validity of the P3C. Feasibility is measured in terms of the percent of missing values or “don’t know” and in terms of floor effects and ceiling effects (the percent of respondents with the lowest possible and the highest possible score). Low rates of missing or “don’t know” values indicate that respondents are able to answer items, while high rates of missing or “don’t know” values may indicate problems such as undue respondent burden or unclear or difficult items, or problems in the language translation from the original American English source document. Small floor and ceiling effects indicate that the instrument allows parents to respond to an adequate range of experiences. Reliability is measured in terms of internal consistency. High internal consistency indicates that items grouped into a scale are measuring a similar construct. Validity is demonstrated by an instrument’s ability to respond as expected, given specific research-based hypotheses. First, we examined the validity of the P3C subscales *via* factor analysis. It is hypothesized that P3C items should be associated with the *a priori* subscales. Second, we examined the P3C’s ability to distinguish between groups thought to differ in the quality of primary care received. In this case, it is hypothesized that higher quality primary care will be reported for parents whose children have health insurance (32, 33), whose children have a regular health care provider (34–36), and whose parents do not report an instance of foregone care (37). Further, we hypothesize that for this vulnerable population, primary care characteristics should be related to health outcomes such as health-related quality of life (38).

METHODS

Measures

Parent’s Perceptions of Primary Care Measure (P3C)

The P3C is based on the Institute of Medicine (IOM) definition of primary care (19). Using this definition as a criterion, the P3C was designed to measure six components of care which, when present, constitute high-quality primary care. High scores reflect care conforming to this *a priori* definition. Thus, the P3C measures quality based on parent reports of their experiences, rather than ratings of satisfaction with those experiences. The P3C was designed to measure the quality of primary care received, rather than the quality of a particular provider of primary care. This was done so that the care received by children without a regular provider and those with multiple providers could also be described in relation to the IOM definition of quality primary care.

The components of primary care included in the P3C are those on which parents are thought able to report. The six components of primary care are defined as follows. *Longitudinal continuity* is defined as the parent’s report of the length of time they have been bringing their children to a regular place or physician (3, 39). *Access* is defined as the parent’s report of timely and convenient access to care for their children (39). *Communication* is defined as the parent’s report of how well the physician listens and explains during their interactions (40). *Contextual Knowledge* is defined as the parent’s report that the physician knows his or her values and preferences about medical care issues, clearly understands his or her child’s health needs, and knows the child’s medical history (3). *Comprehensiveness* is defined as the parent’s report of the extent to which a regular place and/or doctor provides care for acute and chronic problems and preventive services (39, 40). *Coordination of care* is defined as the parent’s report of their physician’s knowledge of other health care visits, as well as the follow-up of problems through subsequent visits or phone calls (3).

Item development and pilot testing of the P3C followed standard survey development protocols (41). The items, grouped by subscale, are shown in the appendix. The instructions read as follows:

The person your child sees for health care might be a general doctor, a specialist doctor, a nurse practitioner, a physician assistant, or a nurse. Even though these questions ask about “the doctor,” please think

about the person (or people) your child sees for health care.

Except for the two longitudinal continuity items, the response scale for the instrument is a 5-point Likert-type scale, with the options 0 = Never, 1 = Sometimes, 2 = Often, 3 = Almost Always, and 4 = Always. For the coordination scale, an additional response choice of NA (not applicable) is included, and scored as a user-missing value. For ease of interpretability, items are transformed to a 0–100 scale, with 100 being best, as follows: 0 = 0, 1 = 25, 2 = 50, 3 = 75, 4 = 100. The response scale for the longitudinal continuity items is; 0 = no particular place (person), 1 = less than 6 months, 2 = 6 months to 1 year, 3 = 1–2 years, 4 = 3–5 years, 5 = more than 5 years. These responses are rescored to be compatible with the 0–100 scale as follows: 0 = 0, 1 = 20, 2 = 40, 3 = 60, 4 = 80, 5 = 100. The Total Scale score, as well as the scores for each subscale, is formed by computing the mean of the nonmissing values on that scale. Items on the P3C are unit-weighted. This is the more conservative approach in the absence of evidence linking particular items to established criteria, and avoids the possibility of overfitting item weights to a particular sample (42).

The P3C was developed in English, and then translated into Spanish, Vietnamese, and Tagalog. Translation was accomplished using forward-backward translation striving for conceptual, as opposed to syntactical equivalence and consistent language level (43–47).

Other Measures

In addition to sociodemographic measures, parents were asked whether there was someone they would consider their child's personal doctor, whether their child currently had health insurance, and whether there had been any time, in the past 12 months, when they felt their child should have gotten health care but did not (37) (an indicator of foregone, or missed care). Parents also completed the Pediatric Quality of Life Inventory™ (PedsQL™), a reliable and valid measure of children's health-related quality of life (48, 49).

Subjects

Eligibility criteria for participation in this study included having a preschool age child in the family, and both parents (or in the case of a single-parent

family, the respondent) reporting agricultural, unskilled labor, or semi-skilled labor occupations. A total of 297 parents of children were enrolled in the study.

In Imperial County, subjects were recruited from Head Start centers dedicated to farm worker families. Eligibility criteria for enrollment in these Head Start programs include the following: (1) parents must have received at least 50% of their income in the last 12 months from agriculture-related work; (2) they must have moved within the last 3 years in search of employment; and (3) they must have moved with their family from one area to another in search of employment. Of the 308 eligible preschoolers in these programs, 190 parents (61.7%) were approached for recruitment and of these, 188 (98.9%) agreed to participate. Recruitment occurred primarily when parents were picking up or dropping off children from the centers or from the school bus stops. In addition, staff contacted parents and referred them to the interviewers, and interviewed parents referred other parents who also had children in the same preschools.

In San Diego County, subjects were recruited from Head Start centers primarily serving farm worker families, and from a community site. For the Head Start sites, a sampling frame of all agricultural workers who currently had children enrolled in the Head Start programs listed a total of 105 potential respondents. Of these, 73 were contacted for recruitment, and 100% of those contacted consented to participate. In order to potentially reach the undocumented population of farm workers in Northern San Diego County, we reserved a space at a local swap meet frequented by the Latino population, particularly undocumented farm workers. A total of 36 participants were recruited from this site. The refusal rate at this site is estimated to be at around 15%. Many potential respondents were turned away due to their ineligibility for study participation (i.e. not having a preschool age child).

Procedures

Local, bilingual, bicultural research assistants (three in Imperial County, two in San Diego County) were trained during a half-day session on research conduct and ethics, survey administration, and data reporting. Research assistants approached potential subjects at Head Start sites. We offered a modest stipend to subjects to compensate them for their

Table I. Floor and Ceiling Effects for P3C Total and Subscales, Overall Sample and Subgroups

P3C scale	Insurance status					
	Overall		Insured		Uninsured	
	Floor (%)	Ceiling (%)	Floor (%)	Ceiling (%)	Floor (%)	Ceiling (%)
Total	0.0	0.0	0.0	0.0	0.0	0.0
Continuity	6.7	0.1	2.9	1.4	15.6	2.2
Access	0.7	18.5	0.5	19.8	1.1	15.6
Contextual Knowledge	3.4	34.3	2.9	35.7	4.4	31.1
Communication	1.0	52.5	1.0	55.6	1.1	45.6
Comprehensiveness	4.4	23.2	3.4	22.7	6.7	24.4
Coordination	6.1	34.3	5.8	34.3	6.7	34.4

time in completing the brief interview. We did not require the disclosure of any identifying information. After informed consent was obtained, the research assistant administered the survey verbally. The interview was conducted in Spanish in 96% of cases. This research protocol was approved by the human subjects protection committees at Children's Hospital and Health Center, San Diego; California State University, San Marcos; and San Diego State University.

RESULTS

Sample Descriptives

The parents (87.2% mothers) reported on behalf of 297 children (52.5% boys). One hundred and nine (36.7%) of the subjects were accrued in San Diego County and 188 in Imperial County. Parents reported the presence of a chronic health condition in 32 cases (10.8%). Most (87.7%) households were reported as two-parent (married or cohabitating), with more than two thirds (69.5%) of mothers married and 18.2% living with someone. Most mothers listed housewife (63.1%) or unskilled labor (farm worker, laborer, or housekeeper; 34.6%) as occupations. Fathers' occupations were listed as farm workers or laborers in 70.3% of cases, with an additional 8.4% listed as some form of unskilled labor. About 8 in 10 parents (80.7% of mothers and 82.5% of fathers) did not graduate from high school, and three quarters (74.9%) of families had an annual income of \$20,000 or less. Families reported that at least one member traveled to follow work at least 1 month per year in 42.4% of cases; however, almost all families (93.4%) considered the county of the interview to be their permanent home base.

Feasibility

There were virtually no missing or "don't know" values. Of the 6831 total responses (297 subjects answering 23 questions each), there were a total of four missing or do not know answers.

Table I shows the percent of respondents scoring at the minimum (floor effect) and maximum (ceiling effect) of the scale for the sample overall, and for subgroups divided by insurance status. For the P3C Total Scale, there were no respondents scoring at the minimum or maximum values, indicating that the Total Scale has the ability to capture the full range of experiences. There were moderate to substantial ceiling effects for four of the six subscales – Contextual Knowledge, Communication, Comprehensiveness, and Coordination.

Internal Consistency Reliability

The internal consistency reliability (alpha) coefficients, as well as scale descriptives, of the P3C Total scale and subscales are displayed in Table II. An alpha coefficient of 0.70 is recommended for group comparisons, while the more stringent 0.90 level is recommended for individual level comparisons (42). As can be seen, the internal consistency for the Total

Table II. Scale Descriptives and Internal Consistency Reliability for P3C

P3C Scale	<i>N</i>	Mean	<i>SD</i>	alpha
Total	297	67.41	22.29	0.91
Continuity	297	57.00	25.68	0.73
Access	296	65.17	27.16	0.62
Contextual Knowledge	297	70.32	31.60	0.88
Communication	297	82.75	25.63	0.88
Comprehensiveness	297	60.11	31.33	0.76
Coordination	297	63.02	36.28	0.85

Note. alpha = Cronbach's internal consistency coefficient.

Table III. P3C Factor Loadings

Scale and item	Factor					
	1	2	3	4	5	6
Communication						
Doctor listens to you	0.86	0.04	0.03	0.05	-0.09	-0.01
Doctor explains things so you can understand	0.83	-0.03	0.06	0.01	0.07	-0.03
Doctor spends enough time with you	0.70	0.02	0.12	0.17	-0.04	-0.07
Feel comfortable asking questions	0.65	0.02	0.13	-0.16	0.12	-0.09
Longitudinal Continuity						
Continuity to place of care	-0.05	0.89	0.03	-0.02	-0.10	0.03
Continuity to regular provider	0.05	0.86	0.00	-0.08	-0.03	-0.05
Coordination						
Doctor follows up on care	-0.05	-0.05	0.91	-0.04	0.06	-0.08
Doctor communicates with other clinicians	-0.03	-0.05	0.90	0.06	-0.07	-0.05
Doctor arranges other care	0.12	-0.03	0.77	-0.05	0.08	-0.05
Doctor works with school	0.06	0.14	0.67	0.03	-0.02	0.15
Comprehensiveness						
Doctor talks about keeping child healthy	0.72	-0.01	0.01	0.24	-0.03	0.00
Doctor talks about keeping child safe	0.03	-0.04	0.01	0.84	0.05	0.09
Doctor talks about child's behavior	-0.04	-0.03	0.01	0.83	-0.02	-0.15
Doctor talks about growth and development	0.30	-0.03	0.07	0.64	-0.04	0.01
Doctor can take care of almost any problem	0.42	-0.01	0.21	-0.01	0.15	-0.24
Access						
Can get help after hours	-0.09	-0.12	0.15	0.08	0.82	0.01
Can get sick appointment in one day	0.45	0.01	-0.04	-0.10	0.59	0.02
Can get routine care within 3 weeks	0.42	0.06	-0.07	-0.01	0.44	-0.10
Site easy to travel to	0.12	-0.15	0.02	-0.14	-0.24	-0.70
Contextual Knowledge						
Doctor knows your concerns	-0.03	0.17	0.13	0.23	0.18	-0.62
Doctor knows child overall	0.05	0.23	0.00	0.21	0.19	-0.61
Doctor knows your values and beliefs	-0.01	0.16	0.14	0.20	0.19	-0.59
Doctor knows child's medical history	0.16	0.24	0.03	0.04	0.22	-0.49
Eigen value						
	8.64	1.87	1.73	1.55	1.02	0.99
Percent variance						
	37.55	8.14	7.51	6.72	4.45	4.29

Note. Total variance explained: 68.66%.

Scale exceeds the level recommended for individual comparison, and five of six subscales of the P3C subscales exceed the level recommended for group comparison, with three of the six subscales approaching or exceeding the level for individual comparison.

Validity

The factor structure of the P3C was examined using factor analysis. Table III displays the results of the principal components factor analysis, using oblique rotation and forcing six factors (the same number as the number of subscales). Factor rotation converged in 10 iterations and the solution explained a total of 68.66% of the variance. Four of the six scales are consistent with the *a priori* hypothesized P3C scales. Two scales, Communication and Access to care, had several items that loaded significantly on other scales.

Table IV displays the comparisons on mean P3C Total Scale scores between groups thought to differ in the quality of primary care received. Independent sample *t*-tests compared children with and without health insurance, children with and without a regular physician, and children with and without an instance of foregone care. All comparisons were statistically

Table IV. Known Groups Comparison for P3C Total Score

	<i>N</i>	Mean	<i>SD</i>	<i>t</i>	<i>df</i>	sig	Effect size
Health insurance?							
Yes	207	69.37	21.32	2.31	295	0.02	0.30
No	90	62.91	23.90				
Personal doctor?							
Yes	195	74.36	18.61	8.22	295	0.001	1.09
No	102	54.13	22.80				
Foregone Care?							
Yes	26	54.97	27.64	-3.03	292	0.003	0.50
No	268	68.70	21.46				

Note. *t* = *t*-test statistic; *df*= degrees of freedom; sig = alpha.

Table V. Pearson Correlation Coefficients Between P3C and PedsQL™ Scales and Subscales

P3C scale	PedsQL™ Scale		
	Total	Physical functioning	Psychosocial functioning
Total	0.28**	0.23**	0.25**
Continuity	0.10	0.08	0.09
Access	0.22**	0.15*	0.23**
Contextual Knowledge	0.20**	0.17*	0.18*
Communication	0.24**	0.23**	0.19*
Comprehensiveness	0.18*	0.11	0.19*
Coordination	0.24**	0.24**	0.18*

* $p < 0.01$, ** $p < 0.001$.

significant, with effect sizes in the hypothesized direction in the medium to very large range (50).

Table V displays the correlations between the P3C Total Scale and subscales and the PedsQL™ 4.0 Generic Core Scales, including the Total Scale as well as the Physical and Psychosocial Functioning Summary Scales. As expected, the P3C Total Scale and the PedsQL™ 4.0 Total Scale are correlated at $r = 0.28$, with the subscales of the instruments indicating small to medium correlations.

DISCUSSION

This study presents the feasibility, reliability, and validity of the Parent's Perceptions of Primary Care measure (P3C) for children of Latino farm workers. Based on the IOM definition of primary care, the P3C elicits a parent's reports of certain characteristics of their child's primary care which, when present, constitute high-quality care. The P3C Total Scale showed strong evidence of feasibility, reliability and validity. The absence of missing or "don't know" values and floor or ceiling effects for the P3C Total Scale indicates parents' ability to use the P3C and the measure's ability to capture the range of experience for this sample. We attribute the low rate of missing/do not knows to the facts that the reading level of the instrument was below the 8th grade level (18) and the instrument was administered *via* interview by trained, local, bilingual, bicultural interviewers. The internal consistency reliability of the P3C Total Scale exceeded the stringent 0.90 standard required for comparisons between individuals. The Total Scale performed as hypothesized in comparing known groups and, as hypothesized, was related to parents' reports of their child's health-related quality of life. These data suggest that the P3C is a feasible,

reliable, and valid measure of primary care characteristics for children of Latino farm workers.

Results for the subscales were more equivocal. The ceiling effects for some of the subscales indicate a restricted response range. In most cases, the internal consistencies of the subscales exceeded the 0.70 standard required for group comparisons. The results of the factor analysis supported the *a priori* hypothesized factor structure in four of six subscales. This is in contrast to the factor analysis of the P3C in a diverse, urban, community sample (18), where every item loaded on its *a priori* hypothesized factor. These findings may be a result of factor instability, problems with the translation of the items, or sample-specific results. Multivariate ANOVAs (not shown) revealed inconsistent differentiation of known groups using the *a priori* subscales. Most of the subscales were significantly, but not strongly related to health-related quality of life. For these reasons it is suggested that the P3C Total Scale be used in populations such as this, while the subscales be used more for exploratory and hypothesis-generating purposes.

Compared to the urban community sample (mean = 62.1, $SD = 24.7$) (18), P3C total scores were slightly higher in this sample (about five points, or 0.25 standard deviation). While this is unexpected, given this populations' demographic vulnerability, other factors help to put this into context. Since this sample lives along the US–Mexican border, we assessed, in results presented elsewhere (51), whether parents sought care for their children in Mexico and whether the source of care was associated with P3C scores. We reasoned that fewer linguistic and cultural barriers might confer an advantage for Mexican care. We found that more than half of this sample received a majority of their child's health care in Mexico. Moreover, Mexican care (mean = 69.1, $SD = 23.1$) was associated with higher P3C scores than care received in the United States (mean = 65.4, $SD = 21.3$) (51). These comparisons further reinforce the potential usefulness of the P3C in a variety of populations.

Several shortcomings exist. This sample was a convenience sample and restricted in age to preschool children. The use of a convenience sample might affect the results by introducing unknown biases into the sample. For example, it might be the case that Latino farm workers with the wherewithal to enroll their child in a Migrant Head Start center are systematically different from those who could not or would not. More representative and broader sampling in this population would strengthen the

evidence for the psychometric properties of this measure. Regarding translation, although the measure was translated using state-of-the-art methods, it was not simultaneously developed in English and Spanish, as has been sometimes recommended. However, the measure appears to be feasible, reliable, and valid in Spanish and the present method has the advantage of creating a set of items that are parallel across language. Given the factor analysis findings, further testing with Spanish-speaking participants, and with a larger sample size, will address the issue of factor stability across language and groups. Finally, test-retest reliability was not assessed for the P3C in this study.

These results have several implications for pediatricians, patients, purchasers, and policy makers. Those pediatricians, medical groups, and clinics interested in performance improvement now have a measure that can serve as an indicator of the quality of primary care experienced by children of Latino farm workers. The instrument's brevity minimizes respondent burden, and the results presented here support the idea that it is sufficiently reliable and valid to measure changes in quality of care cross sectionally, and perhaps even over time. Parents and those purchasing health care have, in the P3C, a common metric for evaluating the experiences of parents of children with chronic health conditions in a particular pediatric practice or group. Such information could be useful for enrollment and purchasing decisions. Policy makers, likewise, have a tool to measure the experiences of populations of interest, such as children covered by Medicaid, or the federal State Child Health Insurance Program (SCHIP), as well as other groups of interest including children of color or those with limited English ability. As health care stakeholders continue to struggle with documenting and improving the quality of health care services, the P3C should prove a useful tool in this effort.

APPENDIX: PARENT'S PERCEPTIONS OF PRIMARY CARE (P3C) ITEMS

Longitudinal Continuity

1. If there is **one particular place** that you take your child for almost all his/her health care **how long** has this been your child's place for health care?
2. If there is **one particular person** that you think of as your child's regular doctor or nurse, **how long** has this person been your child's doctor or nurse?

Access

3. Is it easy for you to **travel to** the doctor?
4. Can you see the doctor as soon as you want for **routine care** (check ups, physicals) for your child?
5. If your child is **sick**, can you see the doctor within one day?
6. Can you get help or advice on **evenings or weekends**?

Contextual Knowledge

7. Do you feel the doctor knows your child's **medical history**?
8. Do you feel the doctor knows your **concerns** about your child?
9. Do you feel the doctor knows your **values and beliefs** about health?
10. Do you feel the doctor knows your child **overall**?

Communication

11. Do you feel comfortable asking the doctor **questions**?
12. Does the doctor **explain things** to your satisfaction?
13. Does the doctor spend **enough time** with you and your child?
14. Does the doctor **listen to you**?

Comprehensiveness

15. Can the doctor **take care of** almost any problem your child might have?
16. Does the doctor talk to you about **keeping your child healthy**?
17. Does the doctor talk to you about **safety** (like car seats, seat belts, bike helmets, accidents)?
18. Does the doctor talk to you about your child's **growth**?
19. Does the doctor talk to you about your child's **behavior in general** (like having friends, citizenship at school)?

Coordination

20. When necessary, can the doctor **arrange for** other health care for your child?
21. When necessary, do you feel that the doctor **follows up** on visits to other health care providers?
22. Do you feel the doctor **communicates with** other health providers about your child, when necessary?
23. When necessary, do the doctor and the **school** work together for your child's health?

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