

Child Healthcare in Two Farmworker Populations

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Abstract Children in farmworker families are medically underserved. Little research has documented the healthcare of these children. This analysis uses data collected from two populations of Latino farmworker families, one located in western North Carolina and western Virginia, and the other located in eastern North Carolina, to describe and compare child healthcare utilization and mothers' satisfaction with their children's healthcare. Child, mother, household and health services characteristics are examined as causes of variation in child healthcare utilization and mothers' satisfaction for each farmworker population. Results highlight strengths in the provision of healthcare to farmworker children, including most receiving care at a consistent healthcare facility, age appropriate time since last visit, and satisfaction with the care received. Shortcomings in farmworker child healthcare include few having a consistent healthcare provider, and many not receiving visits with recommended frequency. Differences observed in child health services between the two populations include dissatisfaction with care received, perceptions that healthcare staff members are disrespectful, and difficulties with transportation. Further research is needed to determine the best means of providing care to this underserved population.

Keywords Immigrant health · Child health · Health disparities ·
Hispanic/Latino health · Rural health

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Introduction

Migrant and seasonal farmworkers perform a wide variety of labor-intensive tasks critical to agriculture in the United States. There are no recent estimates of the national migrant and seasonal farmworker population, but state estimates indicate that over two million agricultural workers labor in the US [1, 2]. Over 90% of farmworkers are Latino [3]. The 2001–2002 National Agricultural Workers Survey indicates that 63% of adult migrant and seasonal farmworkers have minor children living with them [3]. The large number of Latino farmworker adults and children creates special concerns for the healthcare system [4].

Farmworkers are at risk for a wide variety of occupational and environmental injuries and illnesses [5]. Farmworker children are often exposed to the same occupational hazards as their parents, as they frequently work with their parents in the fields [6]. Farmworker children are also at risk for poorer health than other US children due to substandard housing conditions, exposure to communicable diseases, exposure to pesticides and other environmental toxicants, poverty, and limited access to healthcare [4, 7–9]. Women in farmworker families receive inadequate rates of prenatal care and have high rates of pregnancy-related iron deficiency anemia [10]. A high proportion of children in farmworker families do not receive immunizations according to recommended guidelines [11]. Though recent adult immigrants are generally healthy [12], there is concern for increasing prevalence of chronic diseases, like diabetes, as Latinos adopt behaviors similar to those of the majority US society [13, 14].

While at high risk for injury and illness, farmworkers and their families are medically underserved [4]. Three out of five farmworker families live below the poverty level [3]. Farmworkers seldom have health insurance. Latino immigrants are often unfamiliar with available services or may receive inadequate treatment. Healthcare facilities are often not equipped with appropriate interpreter and culturally sensitive services [15, 16]. The US healthcare system and healthcare provided in Latino immigrants' native countries differ culturally and structurally. For example, obtaining a medication in the US requires a doctor visit and prescription, while in some Latin American countries an injectable medication can be obtained from a pharmacy without a prescription [12]. Latinos in the US seek medicine and similar therapies from *tiendas*, which operate like their home country pharmacies [17]. *Tiendas* are stores that cater to the Latino population of a community; they are generally owned by Latinos and much of their merchandize represents products and brands from Latin American countries. Differing cultural expectations and an unfamiliar healthcare system may negatively affect utilization [18–23]. For example, in eastern North Carolina, 53% of migrant farmworker mothers reported that their children did not receive needed healthcare [24]. Farmworker children living along the US-Mexico border receive a majority of their healthcare in Mexico regardless of their US insurance status [25]. Farmworker children in most of the US cannot easily access healthcare in Mexico.

As part of the 1962 Migrant Health Act, each state has federally funded health programs that target farmworkers and their families with primary care and prevention. These programs attempt to overcome barriers with interpreters, extended hours, and low cost services [26]. However, fewer than 20% of farmworkers use these services [12]. Further, the 1996 Welfare Reform Act, which was designed to prevent undocumented and most legally documented immigrants from receiving public assistance [27], prevents most foreign-born farmworker children and parents from qualifying for healthcare

programs like Medicaid. Lack of insurance and financial barriers may explain the limited utilization of healthcare by Latino children in the US [28]. However, non-financial barriers such as transportation access, knowing where to seek care, and needing to work may better explain utilization of healthcare among farmworkers [29]. Understanding physical and cultural barriers to utilization of healthcare is important in developing an effective and culturally sensitive medical system to serve farmworker populations.

Other than the investigations of Seid and colleagues along the US-Mexico border [25], and of Weathers and colleagues in North Carolina [24, 29], research has not addressed child healthcare utilization and satisfaction among farmworkers. Using survey interview data from projects conducted with two populations of Latino farmworkers in North Carolina and Virginia, the goals of this analysis are (a) to describe child health services characteristics, (b) to describe child healthcare utilization and satisfaction, and (c) to delineate the health services characteristics, as well as the child, mother and household characteristics associated with child healthcare utilization and satisfaction.

Methods

Data for this analysis were collected as part of two community-based participatory health education projects: “La Familia: Reducing Farmworker Pesticide Exposure” and “Casa y Campo: Pesticide Safety for Farmworker Families.” Both projects were collaborations between Wake Forest University School of Medicine, located in Winston-Salem, North Carolina, and the North Carolina Farmworkers Project, located in Benson, North Carolina. Each of these projects was focused on residential pesticide safety education, with lay health advisors or promotoras providing direct education to farmworker families. Promotoras are influential women within the community who are able to recruit through social networks, references, and service organizations [30, 31]. Both projects were also designed to conduct research on topics of concern to the community.

Child healthcare concerns were expressed by members of both farmworker communities. Like farmworkers throughout the country [3, 6], those in North Carolina and Virginia have very low incomes and work in an industry that does not provide health insurance for its workers or their family members. Therefore, farmworker families are very limited in how they can obtain healthcare for their children. They have few options for changing healthcare facilities or providers should they become dissatisfied with the services they receive.

La Familia was conducted in five western North Carolina counties (Alleghany, Ashe, Avery, Mitchell, Watauga), and three western Virginia counties (Smyth, Grayson, and Carroll). Approximately 4,000 farmworkers plus their families work in the five North Carolina counties each year [32]. County level estimates of the farmworker population are not available for Virginia. The North Carolina counties are served by numerous family and pediatric practices and health departments. Watauga County has a free clinic available and the Alleghany Partnership for Children receives federal funding as a migrant health provider. Healthcare in Virginia includes Smyth County Hospital and the Virginia Department of Health. In Grayson County, the county health department and three local primary care clinics provide services to the community.

Casa y Campo was conducted in the eastern North Carolina counties of Duplin, Harnett, Johnston, Sampson, and Wake. Approximately 13,500 farmworkers plus their families work in these North Carolina counties each year. Healthcare and community services in these counties offer support to farmworker families. Wake County offers two free clinics. Rural health clinics serve Latinos in Duplin, Sampson, and Johnson counties. Project Access [33], an organization coordinating charity health services to patients who may not qualify for state or federal assistance, offers services for children in these counties.

Sampling

La Familia participants were recruited through the project's community pesticide safety promotora program. Interviews were completed with 101 women recruited by the promotoras from October to December, 2004. Participating women were employed as farmworkers or lived with another adult employed as a farmworker, and had at least one co-resident child aged 0–13 years. Generally, promotoras recruited women who were in their social networks or who lived near them. Due to the low population density in the rural, mountainous region in which the project was conducted, promotoras also went outside of their social networks and neighborhoods to identify participants. This analysis is limited to 90 households with a child 0–7 years of age; this group was selected because age appropriate guidelines for well-child healthcare visits are available [34].

Casa y Campo participants in eastern North Carolina were recruited using a site-based approach [35], in which sites included the project's community pesticide safety promotora program, churches, Head Start programs, trailer parks, individual dwellings, and laundromats. This sampling method is appropriate for hard to find populations, such as Latino immigrants residing in rural communities [36]. Interviews were completed with 186 women in June and July, 2004. Participants were women who were employed as farmworkers or lived with another adult employed as a farmworker, and had at least one co-resident child aged 0–17 years. This analysis is limited to 146 households with a child 0–7 years of age.

Data Collection

Interviews for La Familia and Casa y Campo participants were conducted by trained Spanish-speaking interviewers using a detailed protocol that included the same set of child healthcare questions. Interviews for each study took approximately 25 min to complete. The questionnaires included items on the characteristics of the focal child (the child closest to age 5 years), parents, and household, as well as on the focal child's healthcare utilization, health services characteristics and satisfaction. For La Familia, each participant was provided with a \$20 incentive for completing the interview. For Casa y Campo, each participant was provided with a small gift for completing the interview. All data collection procedures were approved by the Wake Forest University School of Medicine Institutional Review Board.

Measures

The outcome variables for this analysis were child healthcare utilization and satisfaction with child healthcare. Two dichotomous measures of child healthcare utilization were

constructed: frequency of healthcare visits and length of time since the last healthcare visit. Each was based on American Academy of Pediatrics (APA) Recommendations for Preventive Pediatric Health Care [34]. Frequency of healthcare visit was based on the interview item, “How often do you usually take your child to the doctor?” This measure had the value of age appropriate when children aged 0–2.25 years had a healthcare visit at least every 6 months, and when children age 2.26–7 years had a healthcare visit at least once per year; less frequent health care visits had the value of age inappropriate. Length of time since the last health care visit was based on the interview question, “How long ago was the last time you took your child to the doctor?” This measure had the value of age appropriate when children aged 0–2.25 years had a healthcare visit in the past 6 months, and when children age 2.26–7 years had a healthcare visit within the past year; less frequent health care visits had the value of age inappropriate. Finally, two dichotomous measures of satisfaction were constructed. Satisfaction with healthcare was based on the single item, “Overall, how satisfied are you with the health care your child is receiving,” and had the values satisfied and dissatisfied. Satisfaction with treatment by facility staff was also based on the single item, “How satisfied are you with the way the clinic staff treats you in the place your child is receiving health care?” and also had the values satisfied and dissatisfied.

The primary predictors of healthcare utilization and satisfaction are health services characteristics. The measure consistent healthcare facility was based on responses to two interview items. Participants were first asked, “If you take your child to a particular place for most of his/her medical care, what is it called?” Those who could name a particular place at which their child received medical care, were asked, “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?” One of the responses for this item was, “I don’t take my child to one particular place for medical attention.” The measure had the value of consistent for children aged up to 2.25 years if they had received care at the same facility for 6 months or longer, and for children aged 2.25–7 years if they had received care at the same facility for 1 year or longer. The measure consistent healthcare provider was based on the interview item, “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?” One of the responses for this item was, “There is no person in particular whom I consider to be my child’s doctor.” This measure had the value of consistent for children aged up to 2.25 years if they had received care from the same provider 6 months or longer, and for children aged 2.25–7 years if they had received care from the same provider for 1 year or longer. Interpreter availability had the three values not available, available but low quality, or available and high quality or not needed. This measure was constructed from the responses to two items. The first asked if interpreters were available when the respondent took her child to the doctor, and the second asked for respondent to rate the quality of the interpreter when one was present. Transportation difficulty for healthcare had the value of not difficult if the respondent answered the question, “Is it easy for you to travel to the doctor?” with the responses often, almost always, or always, and had the value of difficult if the responses were sometimes or never. Respect by healthcare staff had the value of respected if the respondent answered the question, “Do you feel that the clinic staff treats you and your family with respect?” with the responses always, almost always, or often, and had the value of disrespected if the responses were sometimes or never. Avoidance of child healthcare due to cost had the values of never avoid and avoid. This measure was based on a single item, which asked the respondents, “Do you ever avoid taking your child to

the doctor because you are concerned with the cost?’’ and had the response categories never, seldom, sometimes and often.

Ten of the focal children, four from the La Familia sample and six from the Casa y Campo sample, were younger than 6 months. Additional information provided by the mothers based on interviewer probes was used to classify each child for the two healthcare utilization measures, the consistent healthcare facility measure and consistent healthcare provider measure.

Other predictors of healthcare utilization and satisfaction include focal child characteristics, mother characteristics, and household characteristics. Focal child characteristics included age, grouped into the categories 0–2.25 years and 2.26–7 years, gender, and, for the La Familia Survey, whether born in the US. Whether the child was born in the US was not collected in the Casa y Campo Survey because the original purpose of the survey did not require this information. Mother characteristics included educational attainment (low attainment, received secondary education or less; high educational attainment, greater than or equal to preparatory school), and length of time in current state (North Carolina or Virginia) (less than 1 year, 1–3 years, or 4 or more). Household characteristics included number of children (1, or more than 1) and adults (1, 2, or more than 2) in the household.

Analysis

SPSS software (Version 14.0; SPSS Inc., Chicago, Ill.) was used for all analyses. Descriptive statistics were calculated for all measures in both the La Familia and Casa y Campo samples. Comparisons of La Familia and Casa y Campo samples for focal child, mother, and household characteristics were examined using Chi-Square. The two samples were then compared via Chi-Square or Fishers Exact tests as to child health service characteristics. A similar analysis compared the two samples on health care utilization and satisfaction.

To examine possible predictors of healthcare utilization and satisfaction, bivariate associations between these outcomes with child, mother, household, and health services characteristics were examined separately for the La Familia and Casa y Campo samples. A critical *p*-value of .05 was used in all analyses. Items whose bivariate associations had a *p*-value of .20 or less were used to create exploratory multivariate logistic regression models predicting healthcare outcomes.

Results

La Familia participants included 90 children, with 27 aged 0–2.25 years, and 63 aged 2.26–7 years. Casa y Campo participants included 146 children, with 42 aged 0–2.25 years, and 104 aged 2.26–7 years (Table 1). There were more girls than boys in the Casa y Campo (81 vs. 65), but more boys than girls in the La Familia sample (47 vs. 43), but this difference was not statistically significant. Most (85.4%) of the children in the La Familia sample were born in the US. This question was not asked of Casa y Campo participants. Most (86.9%) of the mothers had low educational attainment. The mothers in the two samples differed significantly in their length of time in their current state of residence. About 10–15% of both groups had been in the state less than 1 year, while 63.7% of the Casa y Campo mothers had been in North Carolina for 4 or more years

Table 1 Personal characteristics of farmworker focal children, mothers and households for La Familia and Casa y Campo samples

Focal child, mother and household characteristics	La Familia		Casa y Campo		<i>p</i> *
	<i>n</i>	%	<i>n</i>	%	
Focal child characteristics					
Age					
0–2.25 years	27	30.0	42	28.8	.840
2.26–7 years	63	70.0	104	71.2	
Gender					
Female	43	47.8	81	55.5	.250
Male	47	52.2	65	44.5	
Born in US ^a					
Yes	76	85.4	–	–	
No	13	14.6	–	–	
Mother characteristics					
Education level					
High	14	15.6	17	11.6	.388
Low	76	84.4	129	88.4	
Length of time in current state					
Less than 1 year	10	11.1	22	15.1	.001
1–3 years	39	43.3	31	21.2	
4 or more years	41	45.6	93	63.7	
Household characteristics					
Number of children					
1	31	35.2	44	30.1	.419
2 or more	57	64.8	102	69.9	
Number of adults					
1 or 2	55	61.1	76	52.1	.174
3 or more	35	38.9	70	47.9	

* *p*-values based on Chi-Square tests

^a This question not asked of Casa y Campo participants

compared with 45.6% of the La Familia mothers who had been in North Carolina or Virginia. With few exceptions, these mothers had migrated directly from their country of origin to the area in which they were residing at the time of the study. About two-thirds of households in both samples included more than one child. More of the Casa y Campo households (47.9%) than La Familia households (38.9%) included more than 2 adults, but this difference was not statistically significant.

The mothers from the two areas differed significantly in their descriptions of their children's health services (Table 2). About three-quarters from both groups had a consistent healthcare facility. Facilities used for child health care by the participants included private practices, migrant and community health clinics, and county health departments; none of the respondents included a hospital as a facility at which they obtained care for their child. However, while two-thirds (67.8%) of the La Familia participants had a consistent healthcare provider for their child, only 38.4% of the Casa y Campo participants did. Few (8.9%) of the Casa y Campo participants reported interpreters were not available. However, 22.6% reported that when interpreters were available, they were of low quality. In contrast, over half (52.2%) of the La Familia participants reported interpreters were not available, but only 1 (1.1%) La Familia participant indicated that interpreters were of low quality when they were available. Almost two-thirds (63.7%) of the Casa y Campo mothers reported disrespect from

Table 2 Comparison of farmworker mothers' descriptions of child health services characteristics for La Familia and Casa y Campo samples

Child healthcare characteristics	La Familia		Casa y Campo		<i>p</i> *
	<i>n</i>	%	<i>n</i>	%	
Consistent healthcare facility					
Consistent	67	77.0	106	76.3	1.00
Inconsistent	20	23.0	33	23.7	
Consistent healthcare provider					
Consistent	61	67.8	56	38.4	.000
Inconsistent	29	32.2	90	61.6	
Interpreter availability					
Available and high quality, or not needed	42	46.7	100	68.5	.000
Available, but low quality	1	1.1	33	22.6	
Not available	47	52.2	13	8.9	
Transportation difficulty					
Not difficult	74	82.2	96	66.2	.010
Difficult	16	17.8	49	33.8	
Respect by healthcare staff					
Respected	82	91.1	53	36.3	.000
Disrespected	8	8.9	93	63.7	
Avoid care for child due to cost					
Never avoid	90	100.0	113	77.9	.000
Avoid	0	.0	32	22.1	

* *p*-values based on Fishers Exact tests

healthcare staff, while few (8.9%) La Familia mothers reported feeling disrespected by healthcare staff.

Most (82.2%) La Familia mothers reported that it was not difficult to get transportation to take their child to healthcare, while 66.2% of the Casa y Campo mothers indicated that it was not difficult to get transportation. None of the La Familia mothers reported avoiding healthcare because of cost. However, 22.1% of the Casa y Campo mothers reported avoiding child healthcare because of cost.

The mothers from the two areas differed significantly in their use of health services for their children and their satisfaction with these health services (Table 3). While most (about 95%) of the participants reported that their child had an age appropriate time since last visit, half (49.4%) of the La Familia mothers and 82.8% of the Casa y Campo mothers reported that their children had not had age appropriate frequency in their healthcare visits. Almost all (97.8%) of the La Familia mothers reported satisfaction with the care that their children received, and with the treatment they received from healthcare staff. A large majority (87%) of the Casa y Campo mothers also expressed satisfaction with the care their children received and with their treatment by healthcare staff, but 13% expressed dissatisfaction with both.

Several bivariate and multivariate analyses were conducted to discern how child health services, and child, mother, and household characteristics were associated with child healthcare utilization and satisfaction, and if these factors could account for the differences in child healthcare between the La Familia and Casa y Campo samples. No statistically significant differences were found for most analyses. However, statistically significant results were found in the set of bivariate analyses testing the associations of the predictors with frequency of healthcare visits in the La Familia sample. La Familia children who had a consistent healthcare facility (56.1% vs. 30.0% without an established healthcare facility), who were aged 0–2.25 years (73.1% vs. 41.3% of those

Table 3 Comparison of farmworker utilization and satisfaction of child healthcare for La Familia and Casa y Campo samples

Healthcare utilization and satisfaction	La Familia		Casa y Campo		<i>p</i> *
	<i>n</i>	%	<i>n</i>	%	
Frequency of healthcare visits					
Age appropriate	45	50.6	25	17.2	.000
Inappropriate	44	49.4	120	82.8	
Length of time since last healthcare visit					
Age appropriate	86	95.6	136	93.2	.576
Inappropriate	4	4.4	10	6.8	
Satisfaction with care					
Satisfied	88	97.8	126	86.9	.004
Dissatisfied	2	2.2	19	13.1	
Satisfaction with treatment by staff					
Satisfied	88	97.8	125	86.2	.002
Dissatisfied	2	2.2	20	13.8	

* *p*-values based on Fishers Exact tests

aged 2.26–7 years), children born in the US (54.7% vs. 23.1% of those not born in the US), and with higher educated mothers (78.6% vs. 45.3% of those with low education) were significantly more likely to report age appropriate frequency of healthcare visits (Table 4).

Discussion

Through the documentation of utilization and satisfaction with child healthcare among two groups of farmworker mothers, and the investigation of factors that might affect their child healthcare utilization and satisfaction, this analysis begins to provide information needed to improve the provision of health services to this underserved population. The results indicate strengths in the delivery of healthcare for migrant farmworker children. Three-quarters of these children use a consistent healthcare facility, and over 90% of their mothers are satisfied with the care received. Additionally, over 90% of children had an age appropriate length of time since their last healthcare visit, although this finding needs to be interpreted with caution; the lack of appropriate frequency of healthcare visits may indicate that the high compliance for the age appropriate last visit measure is more an indicator of the frequency with which farmworker children experience an acute illness that requires a healthcare visit, than it is an indicator of adherence to practice guidelines. Nonetheless, these results suggest that mothers of farmworker children are accessing the healthcare system on behalf of their children, and that there is a high level of satisfaction with the care they are receiving.

This analysis also documents important shortcomings in the delivery of healthcare for farmworker children. Few mothers reported having a consistent healthcare provider for their children, and substantial proportions of children are not receiving visits with the frequency recommended by AAP. These findings are consistent with previous research [24], and are concerning because regular age-specific visits help to ensure that child health and development are adequately monitored.

Table 4 The association of focal child, mother, household and health services characteristics with age appropriate frequency of healthcare visits among children in farmworker families, La Familia sample

Healthcare, focal child, mother and household characteristics	Percent with age appropriate frequency of healthcare visits	<i>p</i> *
Healthcare characteristics		
Consistent healthcare facility		
Consistent	56.1	.041
Inconsistent	30.0	
Consistent healthcare provider		
Consistent	55.0	.228
Inconsistent	41.4	
Interpreter availability		
Available and high quality, or not needed	48.9	.541
Available, but low quality	0	
Not available		
Transportation difficulty		
Not difficult	49.3	.615
Difficult	56.3	
Respect by healthcare staff		
Respected	48.1	.281
Disrespected	75.0	
Focal child characteristics		
Age		
0–2.25 years	73.1	.006
2.26–7 years	41.3	
Gender		
Female	52.4	.746
Male	48.9	
Born in US		
Yes	54.7	.035
No	23.1	
Mother characteristics		
Education level		
High	78.6	.022
Low	45.3	
Length of time in North Carolina		
Less than 1 year	30.0	.181
1–3 years	46.2	
4 or more years	60.0	
Household characteristics		
Number of children		
1	54.8	.452
2 or more	46.4	
Number of adults		
1–2	48.1	.572
3 or more	54.3	

* *p*-values based on Chi-Square tests

Tiendas have been noted as places in which Latinos can obtain prescription and non-prescription medicines, as well as healthcare information [17, 22]. We do not have any data on the use of tiendas by Latino families in these regions to obtain prescription or non-prescription medicine. However, future research should collect data on how obtaining health services from tiendas affects the use of conventional health care services.

An important finding of this study is the lack of uniformity among Latino mothers in accessing the healthcare system for their children. Our results indicate noteworthy

disparities between mothers in eastern North Carolina (Casa y Campo participants) and those in western North Carolina and Virginia (La Familia participants) in the percentages of children with a consistent healthcare provider, age-appropriate frequency of care, and delays in seeking healthcare because of cost. These differences highlight the reality that healthcare delivery for migrant farmworkers is fragmented.

Some of the differences are counter-intuitive because farmworker clinics and healthcare programs have been established in eastern North Carolina for over a decade. Reasons for regional differences in satisfaction may have to do with the number of immigrants in each location. The number of Latino immigrants (farmworkers and others) in the mountain counties is rather small and has remained stable over the past few years; for example, the US Census counted 530 Hispanics in Alleghany County, NC, for 2000, and the estimated number for 2005 was 781 [37]. In contrast, there has been substantial immigration into the eastern counties so that persons of Hispanic ethnicity, with the size of this population increasing from 9,440 to an estimated 17,792 in Johnston county between 2000 and 2005, and that of Sampson County increasing from 6,477 to 10,671. Thus, substantial growth in the immigrant population, primarily farmworkers, may put a greater strain on services in the East and patients may encounter poorer service because of this.

Our results also document notable differences in experiences with the healthcare system. Differences were observed in the percent of mothers who were dissatisfied with the care their children received, the disrespect they experienced, and their difficulties with transportation. Problems with interpreters are a major problem in the provision of healthcare for Latino children in both populations; however, the form of this problem differs between the populations. For at least half of the La Familia children, no interpreter was available when one was needed; however, when interpreters were available, they were considered to be of high quality. Most of the Casa y Campo mothers indicated that interpreters were available when they obtained healthcare for their children, but one-in-five of these mothers felt that the quality of the interpreters was low. These findings are important at two levels for improving the delivery of healthcare to farmworkers and their children. At the local level, they highlight factors that can be changed to improve access and quality of care, such as hiring and training interpreters, and providing transportation. At the broader system level, they indicate that resource allocation needs to be keyed to local needs, as well as factors, such as consistent providers, that would improve the farmworker health network.

This analysis has a number of limitations that must be considered. It is based on cross-sectional data, and the direction of associations cannot be determined. Statistical power may be limited given the small sample sizes. Further, the nature of these immigrant populations makes the selection of a random sample impossible. Finally, the measures of healthcare utilization could be more detailed and specific. However, this analysis is one of the very few that have addressed the health services of farmworkers and their children [4]. As such, it expands knowledge of the healthcare utilization in this population, and suggests ways that this healthcare utilization can be improved.

Further research on the health services of all members of farmworker families is needed. Methodologically, such research would be improved if larger samples over more extended areas could be recruited. The use of a longitudinal design would help understand the causal relationships between potential predictors and healthcare utilization. Finally, this research would benefit from more objective measures of healthcare utilization. Clearly, further research on farmworker health services is needed to assist in determining the best means of providing care to this underserved population.

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