

Factors Associated with Agricultural Work Performed by Adolescents from an Immigrant Farm Worker Population (MICASA Study)

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ABSTRACT. *While studies have looked at the relationship of adolescent employment with health outcomes and risk behaviors, few have focused on children of hired farm workers. These children face unique challenges affecting their health and work environment. Exploring the frequency and nature of agricultural work characteristics among adolescent children of Hispanic hired farm workers is important for assessing the potential risks they face. Methods: MICASA is a population-based study of settled immigrant Hispanic farm working families in Mendota, California. We selected a cross-sectional random sample of adolescents (ages 11 to 18). Interviews assessed work history, place of birth, and acculturation. Results: 38% of participants were female and 62% were male; 55% were born in the U.S., 38% in Mexico, and 7% in El Salvador; and 49% worked for pay during the last year. Among those who worked, farm work was most frequently reported (73.5%). Among those who had done farm work, the mean age at initiation was 14 years, and they worked a mean of 4.3 weeks during the previous year. Hoeing, picking, and packing/sorting were the most common tasks. In models adjusted for age and sex, low-acculturated adolescents were more likely than moderately acculturated to have worked in the past 12 months, to start work younger than age 14 years, and to do farm work. Significance: Farm work is common among adolescents in this Hispanic agricultural community and is strongly associated with foreign birth and low acculturation.*

Keywords. *Agriculture, Child labor, Children, Employment, Farm workers, Latino, Teenage, Workers, Youth.*

At least half of American youths engage in some type of paid work activity starting as young as age 12 (Herman, 2000). Much of this work is in informal jobs, such as babysitting and yard work. Around the age of 14, many youths transition to more formal work arrangements, often in industries such as retail, service, and agriculture. In California, 41.9% of young people between the ages of 12 and 18 reported working for pay during the previous 12 months during 2005 (CHIS, 2005), and workers between the ages of 14 and 20 comprised 13% of California's agricultural work force during 2003-2004 (Aguirre, 2005).

Adolescents are vulnerable to a variety of risks associated with employment, including

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injury (Evensen et al., 2000; McCall et al., 2007), depression (Largie et al., 2001), decreased physical activity (Bachman and Schulenberg, 1993), smoking (Bachman and Schulenberg, 1993; Largie et al., 2001), substance use (Bachman and Schulenberg, 1993), and high-risk health behaviors in general (Vela Acosta et al., 2007). Risks for injury and death are especially marked among adolescents employed in agriculture (Larson-Bright et al., 2007; McCurdy and Carroll, 2000; McCurdy et al., 2012; Schulman et al., 1997). Previous research has identified several hazards associated with agricultural work among young people including risks from physical hazards such as machinery and equipment; ergonomic hazards from heavy lifting, strenuous work, awkward work positions, and repetitive motion; and risks from environmental hazards such as dehydration and pesticide exposure (Cooper et al., 2005b). Sparse regulatory protection, poor compliance with existing regulatory requirements, and physiologic vulnerability associated with the adolescent's stage of physical, mental, and emotional maturity add to the complexity of occupational health risks among youth (Cooper et al., 2005b; McCurdy and Carroll, 2000; Runyan et al., 1998). For adolescent children of hired farm workers, occupational health risks may be complicated by precarious family circumstances related to parental documentation status (i.e., lack of work authorization), socioeconomic and linguistic barriers, and social marginalization.

Most existing research on the health of young agricultural workers has focused on family farms and children of farm owners rather than on adolescent children of hired farm workers. Health research on young workers in other employment sectors has primarily focused on urban areas, with less attention to rural settings where hired farm workers tend to reside. In addition, little is known about the work experience and associated health risks for adolescent children of farm workers.

The Mexican Immigration to California: Agricultural Safety and Acculturation (MICASA) study is a community-based longitudinal investigation focusing on the occupational and general health status among settled immigrant Hispanic farm workers living in Mendota, a rural agricultural community in California's Central Valley (Stoecklin-Marois et al., 2011). We report here results from the initial cross-sectional survey addressing employment and work experience among adolescent children in these farm worker families.

Methods

Study Design

Data in this cross-sectional study were collected as part of the MICASA project, a longitudinal cohort study of farm worker families residing in Mendota, California (Stoecklin-Marois et al., 2011). Eligible MICASA participants included men and women between the ages of 18 to 55 years who self-identified as Mexican or Central American, resided in Mendota at the time of the survey, and belonged to a household with at least one member who had been engaged in farm work for at least 45 days in the previous year. We conducted baseline interviews from December 2005 through April 2007 among both the head of household and spouse for all households that agreed to participate. The survey instrument collected information on demographic characteristics, occupational and environmental risk factors, acculturation, smoking status, and health outcomes (respiratory health, injuries, mental health, and reproductive health). It also obtained basic demographic information on all children in the household (e.g. age, gender, schooling, and farm work).

We designed a cross-sectional study nested within MICASA to examine work patterns

and health of adolescent children between 11 and 18 years old who were living with their parents. Eligible children were selected from families in which at least one parent had completed the baseline MICASA questionnaire. We identified 324 eligible adolescents between the ages of 11 and 18 years in 194 households. Adolescents were randomly selected from this pool of eligible participants until a total of 101 mother/child pairs were recruited and agreed to participate. A total of 157 households were approached for participation, and 25 of these were determined ineligible. The main reasons for ineligibility included the child was no longer living at home ($n = 15$), the family was lost to follow-up ($n = 7$), or the child was over the age of 18 ($n = 3$).

Of the households that were eligible and invited to participate, 31 declined, yielding a participation rate of 76.5%. During the summer of 2007, we administered a questionnaire to the sample. Questionnaires were available in Spanish and English, depending on the language preference of the child. Trained bilingual, bicultural interviewers administered the surveys.

All procedures, protocols, and survey instruments were reviewed and approved by the University of California-Davis Institutional Review Board. For all persons age 18 and older who agreed to participate, researchers obtained informed written consent in the participant's preferred language. Written permission of the parent and written assent of the minor child were obtained in either Spanish or English, according to the language preference of the individual parent or child.

Measures

Participating mothers were interviewed about the selected adolescent child with a focus on sociodemographic information, school attendance, general health, and respiratory health. Participating adolescents were interviewed separately from the parent to assess acculturation, work history, respiratory health, physical activity, diet, safety habits such as wearing a seat belt and bicycle helmet, and health risk behaviors, such as smoking, alcohol, and drug use. This article focuses on data collected from the adolescent interviews, specifically with regard to work-related characteristics.

Sociodemographic and Work Characteristics

Adolescents were asked if they had worked for pay in the previous 12 months, including the type of work and average number of hours worked per week during the academic school year. All who reported that they had worked for pay during the past 12 months were specifically asked if they had done any work on a farm during that period, either paid or unpaid. Adolescents working on farms were asked about the number of weeks worked on a farm in the past 12 months, including summer work, as well as the types of crops and tasks. All participants, regardless of whether they had worked in the last 12 months, were asked about their age at which they first began working at any job.

Acculturation

Acculturation level was assessed for all adolescents using the Short Acculturation Scale for Hispanic Youth (SASH-Y) (Barona and Miller, 1994). The SASH-Y is a 12-item scale that measures three factors related to acculturation: language, media, and ethnic social relationship preferences. Responses range on a five-point Likert scale and are summed across all 12 items to calculate a composite score ranging from 12 to 60, with higher scores indicating higher levels of acculturation. The SASH-Y has been successfully used in other published studies addressing the influence of acculturation on a variety of outcomes among Hispanic adolescents (DeLucia-Waack and Cavazos-Rehg, 2009;

Olvera et al., 2010). Scores on the SASH-Y are based on standardized cutoffs and are interpreted as follows: a score of 29 or less indicates low acculturation, a score between 30 and 45 indicates moderate acculturation, and a score of 46 or greater indicates high acculturation.

Statistical Analysis

Bivariate analyses were done comparing work characteristic outcomes of interest with sex, age, place of birth, and acculturation level, and chi-square or Fisher's Exact test (for small sample sizes) were used to assess these comparisons across groups. General linear models compared the mean values of continuous measures by sex. Multivariable logistic regression models yielded the odds of work characteristics for the variables of interest, controlling for appropriate covariates including age and sex. Data analysis was performed using SAS (ver. 9.2 for Windows, SAS Institute, Inc., Cary, N.C.).

Results

Overall, 62% of participants were male, and 38% were female (table 1). Just over half were born in the U.S. (55%), a little over one-third were born in Mexico (38%), and the small remaining proportion were born in El Salvador (7%). The mean age of responding adolescents was 14.5 years (SD 1.85 years) and did not differ by gender. Acculturation scores ranged from 12 to 42; there were 36 subjects in the low acculturation category, 65 in the moderate category, and none in the high category. While there were no differences in acculturation level by gender, boys were more likely to complete the interview in English ($p < 0.001$). Participants reported that they had lived in Mendota for a median of 9.9 years (SD ± 4.8 years), with boys reporting significantly longer mean residency than girls (11.0 vs. 8.2 years, $p < 0.01$). About 6% of participants were in 5th or 6th grade, 35% were in 7th or 8th grade, and 58% were in high school at the time of the interview, and there were no differences in grade level by gender. Participants also reported aspirations for a college degree (47%) or higher (41%), with a majority reporting obtaining A's and B's in school.

Almost half of the sample (49%) had worked for pay in the last 12 months, although 70% of the adolescents who reported working for pay in the last 12 months did not work during the academic school year. There was no difference in grades among those who worked in the past year and those who did not and similarly among those working in agriculture or not. Among those who worked during the school year, boys worked over three times more hours per week than girls (11.8 vs. 3.3 h, $p < 0.01$). Additionally, 73.5% of those working for pay in the last year had worked on a farm in the previous 12 months. The most commonly reported agricultural crops worked included melons, tomatoes, and cotton, and the most commonly reported tasks in agriculture included hoeing, packing/sorting, and picking. There were few differences by sex for agricultural crops and tasks, but girls were more likely to perform packing/sorting tasks. On average, adolescents who reported working on a farm within the past year worked a mean of 4.3 weeks on a farm with no differences by sex.

In examining patterns of work, there were several associations with any work in the previous twelve months and working on a farm (table 2). Boys were more likely than girls to have worked on a farm during that period (72.2% vs. 27.8%, $p < 0.01$). Sixty-one percent of adolescents aged 16 or older reported farm work in the past 12 months, com-

Table 1. Selected demographic, education, and work characteristics among 101 Hispanic adolescents.^[a]

Characteristic	Entire Sample	Gender		Acculturation Level		
		Male	Female	Low	Moderate	
Entire sample [N, (%)]	101 (100)	63	38	65	36	
Demographics						
Sex	Male	63 (62.4)	-	-	43 (66.2)	20 (55.6)
	Female	38 (37.6)	-	-	22 (33.9)	16 (44.4)
Age category	11 to 12 years	18 (17.8)	12 (19.1)	6 (15.8)	7 (19.4)	11 (16.9)
	13 to 15 years	52 (51.5)	31 (49.2)	21 (55.3)	14 (38.9)	38 (58.4)
	16 to 18 years	31 (30.7)	20 (31.8)	11 (29.0)	15 (41.7)	16 (24.6)
Birthplace	U.S.	56 (55.5)	38 (60.3)	18 (47.4)	15 (41.7)	1 (63.1)*
	Foreign	45 (44.5)	25 (39.7)	20 (52.6)	21 (58.3)	24 (36.9)
	Mexico	38 (37.6)	22 (34.9)	16 (42.1)	15 (41.7)	41 (63.1)
	El Salvador	7 (6.9)	3 (4.8)	4 (10.5)	16 (44.4)	22 (33.9)
Years living in Mendota [mean (SD)]	9.9 (4.8)	11.0 (4.2)	8.2 (5.3)**	8.7 (4.9)	10.6 (4.7)	
Acculturation level	Moderate	65 (64.4)	43 (68.3)	22 (57.9)	-	-
	Low	36 (35.6)	20 (31.8)	16 (42.1)	-	-
Language of questionnaire	English	69 (69.0)	49 (79.0)	20 (52.6)**	16 (46.7)	53 (81.5)**
	Spanish	31 (31.0)	13 (21.0)	8 (47.4)	19 (54.3)	12 (18.5)
Education						
Current grade	5th to 6th	6 (6.4)	4 (6.7)	2 (5.9)	1 (3.1)	5 (8.1)
	7th to 8th	33 (35.1)	24 (40.0)	9 (26.5)	10 (31.3)	23 (37.1)
	9th to 12th	55 (58.5)	32 (53.3)	23 (67.7)	21 (65.6)	34 (54.8)
Grades in school	A's, A/B's, B's	58 (58.6)	37 (58.7)	21 (58.3)	21 (61.8)	37 (56.9)
	B/C's, C's	36 (36.4)	25 (39.7)	11 (30.6)	12 (35.3)	24 (36.9)
	C/D's, D's, D/F's	5 (5.1)	1 (1.6)	4 (11.1)	1 (2.9)	4 (6.2)
Expected school achievement						
	May not finish HS	0	0	0	0	0
	Will finish HS	10 (10)	3 (4.8)	7 (18.9)	5 (14.3)	5 (7.7)
	Will get college degree	47 (47)	32 (50.8)	15 (40.5)	17 (48.6)	30 (46.2)
	Will get degree beyond college	41 (41)	26 (41.3)	15 (40.5)	12 (34.3)	29 (44.6)
	Refused to say	2 (2.0)	2 (3.2)	0	1 (50.0)	1 (1.5)
Work Characteristics						
Work for pay		49 (48.5)	30 (47.6)	19 (50.0)	25 (69.4)	24 (36.9)**
Hours worked during school year	0	32 (69.6)	21 (72.4)	11 (64.7)	19 (82.6)	13 (56.5)
	1 to 10	10 (21.7)	4 (13.8)	6 (35.3)	3 (13.0)	7 (30.4)
	11+	4 (8.7)	4 (13.8)	0	1 (4.4)	3 (13.0)
Work on farm		36 (35.6)	26 (41.3)	10 (26.3)	21 (58.3)	15 (23.1)***
Weeks worked on farm	4 or less	14 (40)	10 (40)	4 (40)	9 (45.0)	12 (80.0)*
	5+	21 (60)	15 (60)	6 (60)	11 (55.0)	3 (20.0)
Crop ^[b]	Melons	15 (41.7)	11 (30.6)	4 (40.0)	7 (53.3)	7 (33.3)
	Tomatoes	9 (25.0)	4 (15.4)	5 (50.0)	9 (42.9)**	0
	Cotton	8 (22.2)	5 (19.2)	3 (30.0)	5 (23.8)	3 (20.0)
	Nuts	5 (13.9)	4 (15.4)	1 (10.0)	2 (9.5)	3 (20.0)
Farm tasks ^[b]	Hoeing	13 (36.1)	7 (26.9)	6 (60.0)	10 (47.6)	3 (20.0)
	Packing/sorting	12 (33.3)	6 (23.1)	6 (60.0)*	7 (33.3)	5 (33.3)
	Picking	11 (30.6)	9 (34.6)	2 (20.0)	5 (23.8)	6 (40.0)
	Tractor/truck driving	2 (5.6)	2 (7.7)	0	1 (4.8)	1 (6.7)

^[a] Asterisks (*) indicate significance: * = $p < 0.05$, ** = $p < 0.01$, and *** = $p < 0.001$.

^[b] Categories not mutually exclusive.

pared to 36% of 13 to 15 year olds and 3% of 11 to 12 year olds. In models adjusted for age and sex, low level of acculturation was significantly associated with increased odds of doing any type of work in the previous year and working in agriculture (table 2).

The mean age of first working at any job was 14 years and did not differ by sex

Table 2. Factors associated with paid work and farm work in prior year among Hispanic adolescents.^[a]

Characteristic	Paid Work in Past 12 Months			Farm Work in Past 12 Months		
	Any Work N (%)	OR (95% CI)	AOR ^[b] (95% CI)	Farm Work ^[c] N (%)	OR (95% CI)	AOR ^[d] (95% CI)
Entire sample	49 (48.5)	-	-	36 (73.5)	-	-
Sex						
Male	30 (61.2)	1.00 (reference)	1.00 (reference)	26 (72.2)	1.00 (reference)	1.00 (reference)
Female	19 (38.8)	1.10 (0.49-2.46)	1.18 (0.48-2.88)	10 (27.8)	0.18 (0.03-0.81)*	0.12 (0.01-0.73)*
Age category						
11 to 12 years	5 (10.2)	0.67 (0.21-2.17)	0.68 (0.21-2.19)	1 (2.8)	0.13 (0.00-1.64)	0.08 (0.00-1.38)
13 to 15 years	19 (38.8)	1.00 (reference)	1.00 (reference)	13 (36.1)	1.00 (reference)	1.00 (reference)
16 to 18 years	25 (51.0)	7.24 (2.52-20.8)*	7.32 (2.54-21.1)	22 (61.1)	3.29 (0.58-23.9)	3.49 (0.52-30.2)
Birthplace						
U.S.	27 (55.1)	1.00 (reference)	1.00 (reference)	16 (44.4)	1.00 (reference)	1.00 (reference)
Foreign	22 (44.9)	1.03 (0.47-2.25)	0.52 (0.20-1.37)	20 (55.6)	6.62 (1.19-70.0)	3.78 (0.45-50.9)
Acculturation level						
Moderate	24 (49.0)	1.00 (reference)	1.00 (reference)	15 (41.7)	1.00 (reference)	1.00 (reference)
Low	25 (51.0)	3.88 (1.63-9.27)*	3.77 (1.42-9.97)*	21 (58.3)	3.08 (0.70-16.4)	7.94 (1.02-117.6)*

^[a] OR = odds ratio; AOR = adjusted odds ratio; * = $p < 0.05$ (Fisher's Exact test due to small cell sizes).

^[b] Adjusted for age (modeled as three-level categorical variable) and sex.

^[c] Sample limited to adolescents who reported working for pay in the last 12 months.

^[d] Adjusted for age (modeled as three-level variable) and sex.

Table 3. Factors associated with age of starting any work among Hispanic adolescents 14 and older.^[a]

Characteristic	Adolescents	Starting Any Work at Age <14 Years		
	Age ≥14 N (%)	N (%)	OR (95% CI)	AOR ^[b] (95% CI)
Entire sample [N, (%)]	69 (100)	11 (15.9)	-	-
Sex [n, (%)]				
Male	41 (59.4)	4 (36.4)	1.00 (reference)	-
Female	28 (40.6)	7 (63.6)	3.03 (0.68-15.9)	-
Birthplace [n (%)]				
U.S.	34 (49.3)	8 (72.7)	1.00 (reference)	1.00 (reference)
Foreign	35 (50.7)	3 (27.3)	0.31 (0.05-1.46)	0.33 (0.05-1.57)
Acculturation level [n (%)]				
Moderate	42 (60.9)	3 (27.3)	1.00 (reference)	1.00 (reference)
Low	27 (39.1)	8 (72.7)	5.33 (1.12-34.7)*	4.82 (1.00-31.7)*

^[a] OR = odds ratio; AOR = adjusted odds ratio; * = $p < 0.05$ (Fisher's Exact test due to small cell sizes).

^[b] Adjusted for sex.

(table 3). Eleven participants over the age of 14 years reported starting work at age <14 years (61.1%), and seven participants under 14 started work at age <14 years (38.9%) (table 3). The mean age of adolescents who reported working for pay in the previous 12 months was 15.3 years (SD 1.86 years) and did not differ by sex. Additionally, while sex and birthplace were not associated with starting work at age <14 years, low acculturated youth were more than four times more likely to begin working at age <14 years.

Table 4. Factors associated with farm work in prior year among 36 Hispanic adolescents reporting farm work in the past 12 months.^[a]

Characteristic	Adolescents Reporting >4 Weeks of Farm Work ^[b]	OR (95% CI)	AOR ^[c] (95% CI)
Entire sample [N, (%)]	14 (40.0)	-	-
Sex [n, (%)]			
Male	10 (71.4)	1.00 (reference)	1.00 (reference)
Female	4 (28.6)	1.00 (0.16-5.57)	0.94 (0.16-5.10)
Age category [n, (%)]			
11 to 12 years	0	-	-
13 to 15 years	5 (35.7)	1.00 (reference)	1.00 (reference)
16 to 18 years	9 (64.3)	0.97 (0.19-5.23)	0.97 (0.19-5.08)
Birthplace [n (%)]			
U.S.	2 (14.3)	1.00 (reference)	1.00 (reference)
Foreign	12 (85.7)	9.08 (1.46-104.6)*	10.1 (1.42-138.7)*
Acculturation level [n (%)]			
Moderate	3 (21.4)	1.00 (reference)	1.00 (reference)
Low	11 (78.6)	4.66 (0.87-33.9)	5.80 (0.89-52.6)

^[a] OR = odds ratio; AOR = adjusted odds ratio; * = $p < 0.05$ (Fisher's Exact test due to small cell sizes).

^[b] Sample limited to adolescents who reported working on a farm in the last 12 months.

^[c] Adjusted for age (modeled as three-level variable) and sex.

Although foreign-born adolescents were not more likely than U.S.-born adolescents to have worked for pay during the past year, they were significantly more likely to report working on a farm in the past year (table 2) and to have engaged in farm work for more than four weeks (table 4). This effect was strongest among Mexican-born adolescents (OR 18.9; 95% CI: 2.63-135.9) compared to U.S.-born adolescents.

Discussion

Working for pay during the previous year was common in this sample of adolescents of immigrant Hispanic farm workers, involving half of the subjects. The likelihood of working increased with age, and boys were more likely to engage in farm work. Acculturation level was strongly associated with work patterns: children with low acculturation had four-fold increased odds of working for pay in the prior year, five-fold increased odds for any work prior to age 14, and eight-fold increased odds for engaging in farm work. Birth outside of the U.S. was associated with increased odds of working on a farm during the past year, as well as working for more than four weeks in agriculture.

Many studies have looked at the relationships of adolescent employment with injury (Bonauto et al., 2003; Cooper et al., 2005a; Evensen et al., 2000; Larson-Bright et al., 2007; McCall et al., 2007; McCurdy et al., 2012; Runyan et al., 1998; Runyan and Zakocs, 2000; Schulman et al., 1997; Walters et al., 2010; Weller et al., 2003a; Weller et al., 2003b; Young and Rischitelli, 2006), health effects, and risk behaviors (Bachman et al., 2003; Bachman and Schulenberg, 1993; Largie et al., 2001; Vela Acosta et al., 2007), yet few have focused specifically on the nature of these relationships among the children of hired farm workers (McCurdy et al., 2002; Wilk, 1993). Like their parents, these children face unique challenges, such as social and economic marginalization, that may affect their health status and their ability to influence or control their work environment. Therefore, understanding employment characteristics and circumstances among children of hired farm workers is important for assessing the potential risks faced by this unique group of workers.

The importance of occupational health and safety for children working in agriculture

should not be underestimated, especially in view of the demanding and dangerous nature of the work and the relative weakness of legal protection regimes (Cooper et al., 2005b; Evensen et al., 2000; Hendricks and Goldcamp, 2010). The U.S. Department of Labor has recently proposed revisions to the Fair Labor Standards Act (FLSA) as it applies to child labor regulations and protection of young workers (DOL, 2010). These revisions were based primarily on recommendations from the 2002 NIOSH review of the child labor Hazardous Occupation Orders (HOs) report (NIOSH, 2002), which made specific proposals regarding important safety modifications for both non-agricultural and agricultural employment among young workers. However, the proposed revisions to child labor regulations have been enacted for non-agricultural hazards only, leaving the agricultural recommendations unfulfilled (DOL, 2010).

Among the major results of our research was the finding of a consistent association of low acculturation with any work in the past 12 months and working on a farm in the past 12 months, suggesting that low-acculturated young people may be at greater risk of adverse outcomes associated with adolescent agricultural work. We are unaware of any other studies examining the relationship of acculturation and employment among Hispanic adolescents, but documented examples of specific adverse outcomes associated with work and relevant to our sample include increased risk of injury associated with agriculture among children performing any farm work (Larson-Bright et al., 2007; Weller et al., 2003b) and increased risk of work-related injury among children from migrant farm worker families (Cooper et al., 2005a). Although we did not have any participants in the high-acculturation group, the marked and consistent differences in work experience between low and moderately acculturated groups argue for a strong association with acculturation.

The underlying mechanism for this association among subjects with low acculturation may relate to increased family economic need (Orellana, 2001), expectations for financial contribution to the family from adolescents (Fuligni and Pedersen, 2002; Fuligni et al., 1999), and cultural norms valuing work (Bachmeier and Bean, 2011; Lopez, 2001). These factors, in conjunction with the tendency of adolescents from immigrant families to place strong emphasis on family obligations (Fuligni, 1998), may help to explain the association of acculturation with work patterns.

Among the other major results of our research was the finding that foreign-born adolescents were at increased odds for engaging in agricultural work and performing more than four weeks of farm work during the past year compared to their U.S.-born counterparts. Other studies have demonstrated that children performing agricultural work are at increased occupational injury risk compared to their peers working in non-agricultural industries (Larson-Bright et al., 2007; Weller et al., 2003b). Although this study did not specifically examine injury experience among the children, the increased odds for working in agriculture among foreign-born respondents suggests that they are also at greater risk for occupational injury than their U.S.-born counterparts.

Our findings with regard to work characteristics among adolescents in hired farm worker families are similar to the results of McCurdy et al. (2002), who examined the work characteristics of California migrant Hispanic farm worker children living in local government-supported migrant housing centers. Overall, the prevalence of working for pay during the previous 12 months was comparable in both studies. While our study found no difference by sex with regard to engaging in any type of work during the past 12 months, both the current study and McCurdy et al. (2002) found that boys were more

likely to hold agricultural jobs than girls. Both studies also found that the likelihood of employment increased with age.

McCurdy et al. (2002) reported that children born in Mexico were more likely to work than children born in the U.S.; in our study there were no differences between these two groups with regard to working in the previous 12 months. However, we found that children born in Mexico were at greater odds for working on a farm in the past 12 months and more likely to have done more than four weeks of farm work during the past year than their U.S.-born or El Salvador-born counterparts. Mexican-born youth were at decreased odds for starting work at age <14 years than those born in the U.S.

Strengths and Limitations

An important contribution of this study on adolescent employment characteristics is its focus on a unique and vulnerable population, the children of Hispanic hired farm workers, a group for whom few published data exist. While it is difficult to estimate the exact size of the hired farm worker labor force, national data for 2010 suggest there were approximately one million hired farm workers in the U.S., about half of whom were Hispanic (USDA-ERS, 2011). Almost three-quarters of hired farm workers are considered settled, meaning they work within 75 miles of their home. Although their children belong to immigrant families, they are a settled, rather than migrant, population. This study represents an early step in describing the prevalence, types, and potential risks associated with work among this group.

Small sample size limited our ability to detect differential patterns of work associated with place of birth and acculturation level, such as for El Salvadorans ($n = 7$). While this limits precision of estimates, it is likely that the observed directions of associations are valid. We did not directly evaluate the relationships of specific health outcomes, such as injury, or specific behavioral risk factors, such as substance use, with agricultural employment in this sample. Future research should focus on examining employment characteristics among specific demographic subgroups of children of immigrant farm workers and associations between employment characteristics and health outcomes such as injury. Examining the role of employment, demographic characteristics, and acculturation, as well as possible adverse health outcomes, is important for understanding the health of Hispanic farm working adolescents and developing appropriate guidelines to prevent occupational injuries in this population.

Conclusion

Agricultural work is common among adolescent children of immigrant hired farm worker families and is strongly associated with foreign birth and low acculturation. While studies have looked at the relationship of adolescent employment with health outcomes and risk behaviors, few have focused on the children of hired farm workers. These children face unique challenges affecting their health and work environment, especially in the agricultural sector. Understanding employment among this unique group is important for assessing the potential risks they face.

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