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Work Safety Culture of Latinx Child Farmworkers in North Carolina

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Abstract

Background: Little research has addressed the safety environment of child farmworkers. This analysis examines the work safety culture experienced by Latinx child farmworkers in North Carolina.

Methods: Survey interviews were conducted in 2017 with 202 Latinx children aged 10 to 17 years employed on North Carolina farms. Analysis included measures of the behavioral, situational, and psychological elements of work safety culture.

Results: The work culture on North Carolina farms employing Latinx child farmworkers places limited value on safety. Behaviorally, many did not wear appropriate work clothing (e.g., 47.5% wore gloves, 37.1% wore boots). Situationally, few received safety training for tools (40.6%), machinery (24.3%), or pesticides (26.0%); about one-third (33.7%) had worked piece-rate; and many did not have field sanitation services available (e.g., 37.1% had water for washing, 19.8%

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Ethics: All procedures were approved by the Wake Forest School of Medicine Institutional Review Board. Participants' parents provided written consent, and child participants provided written assent. The Board approved an exemption to be able to conduct interviews without parental permission among unaccompanied minors, defined as children younger than 18 years of age who had no parent with them in North Carolina.

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had soap). Safety attitudes were mixed, and work safety climate was low, with 21.8% stating that their supervisor was only interested in doing the job fast and cheaply. Greater safety training, field sanitation services, and work safety climate were associated with working in western North Carolina, migrant workers, limited English fluency, and working in tomatoes. Wearing appropriate work clothing, not working piece-rate, fewer unsafe work attitudes were associated with working in eastern North Carolina, seasonal worker, speaking English, and working in tobacco.

Conclusions: This research makes it apparent that efforts are needed to improve safety culture wherever child farmworkers are employed. Current policy is not providing a safe environment for children working on farms in the United States.

Keywords

Agricultural safety; child labor; minority health; vulnerable populations

1 INTRODUCTION

Although the exact number is not known, between 30,000 and 79,325 children aged 10 to 17 years are hired as farmworkers each year in the United States and most these children are Latinx.^{1,2} Current Federal occupational safety regulations allow children aged 10 or 11 years to work on farms not operated by their relatives, as long as they are engaged in nonhazardous jobs outside of school hours with parental permission on small farms to which Fair Labor Standard Act minimum wage requirements do not apply.³ Children aged 12 or 13 years can hold any nonhazardous farm job outside school hours with parental permission or on the same farm on which a parent is working. Those aged 14 or 15 years can hold any nonhazardous farm job outside school hours. Those aged 16 or 17 years can hold any farm job, hazardous or not, with unlimited work hours. In addition to the Fair Labor Standard Act, the only Federal regulation specifically addressing the work safety of child farmworkers is the 2015 revision of the US Environmental Protection Agency's Worker Protection Standard. This regulation restricts anyone under the age of 18 years from applying pesticides.⁴ Children of any age can do any farm job, hazardous or not, on farms operated by their families.⁵⁻⁷ Some states have implemented regulations that impose stricter limits on the ages of children who can work on farms, and on the tasks that they can perform. However, most states, including North Carolina, adhere to the Federal regulations.

Agriculture is an extremely hazardous industry⁷ and children working on farms experience high rates of injury, illness, and mortality.⁹⁻¹³ Studies of the safety and health of hired child farmworkers are limited. Child farmworkers generally do not receive required pesticide safety training.¹⁴⁻¹⁷ Adherence to field sanitation regulations where they work is incomplete.^{2,14} Child farmworkers often engage in hazardous tasks,¹⁸⁻²⁰ but they often do not wear appropriate work clothing and personal protective equipment.¹⁴ A substantial percentage of hired child farmworkers experience non-fatal injuries,^{14,21-23} including musculoskeletal, traumatic and dermatological injury, and commonly report back pain. Whitworth and colleagues²⁴ found high levels of neurotoxicity symptoms among hired child farmworkers.

Work safety culture is the degree to which all members of an organization (management and workers) agree to the value of safety over production. Cooper's²⁵ model of work safety culture includes behavioral, situational, and psychological elements, thereby encompassing all aspects of the work environment. Behavioral elements include observable safety and risk behaviors. Situational elements include safety management programs and actions, such as safety training and adherence to safety procedures. Psychological elements include subjective assessments of safety, such as work safety climate.^{26–28} Work safety culture is an important aspect of workplace safety. This is especially true for the safety of child workers who have little control over how their work is organized or their employers' adherence to work place safety procedures.

Little is known about the work safety culture experienced by children working on farms. A single study²⁹ examined the work safety culture among children working on their parents' farms. Westaby and Lee²⁹ collected survey data from Future Farmers of America members who were the children of farm owners. They found that dangerous risk taking, an indicator of the behavioral element, was associated with a greater risk of injury, and that safety consciousness, an indicator of the psychological element, was associated with a lesser risk of injury. Conversely, safety knowledge, an indicator of the situational element, was also associated with a greater risk of injury. Westaby and Lee suggest this might result from children receiving more safety training when they are placed in more dangerous environments.

A pilot study of North Carolina Latinx child farmworkers using survey interview data collected in 2013 described a negative work safety culture.³⁰ The hired child farmworkers engaged in unsafe general behaviors (e.g., riding in uncovered trucks, not wearing seatbelts) and unsafe work behaviors (e.g., not using safety goggles or hearing protection). Few received training for safely using pesticides, tools, or machinery. They had weak safety attitudes, and their perceived work safety climate is characterized by the perception that their supervisors were "only interested in doing the job fast and cheaply."

A qualitative analysis of Latinx child farmworker work safety culture found that these children understood that their safety was important to their parents, but they observed that few of their supervisors or coworkers valued safety.¹⁹ They recognized many of the hazards they confronted in the work place, but they did not know how to use this knowledge to mitigate work hazards or change behaviors to avoid these hazards. They noted that they received little safety training beyond the imperative to "be careful." The safety training they did receive was often provided informally by family members.

It appears that child workers perceive that safety is not widely valued.¹⁹ Work safety culture perceived by child farmworkers may increase their risk for injury and illness. However, the inadequate research base limits discussions of work safety culture among child agricultural workers and provides little information needed to improve the value of safety among these workers. This analysis uses data collected in 2017 from 202 North Carolina Latinx child farmworkers to address two aims. First, it describes the work safety culture of Latinx child farmworkers, including behavioral, situational, and psychological elements. Second, it

delineates variation in work safety culture elements among Latinx child farmworkers in terms of their personal characteristics.

2 METHODS

2.1 Study Design

*The Child Farmworker Study*³¹ is a longitudinal community-based participatory research study investigating the effects of farm work on the health and development of Latinx child farmworkers. Research partners include Wake Forest School of Medicine, Student Action with Farmworkers, and East Carolina University. Youth farmworker³² and a professional advisory committees advise the investigators on study design and content. Arcury and colleagues³¹ present a detailed discussion of the overall study design. The Wake Forest School of Medicine Institutional Review Board approved the study protocol.

2.2 Participant Recruitment

Participants were recruited and interviewed from April through November, 2017. They included children aged 10–17 years who self-identified as Latinx, spoke Spanish or English, and had been employed as farmworkers in the previous three months. Both girls and boys were recruited. There were no exclusion criteria.

Participants were recruited with the help of farmworker community service and advocacy organizations. Interviewers contacted the parents of potential participants to explain the study, ensure the child met the inclusion criteria, and obtained signed parental permission. The interviewer then met with the potential participant to review the study, inclusion criteria, incentives for participation, and obtained signed assent. A few of the potential participants were “unaccompanied minors,” individuals under age 18 years who did not live with a parent or legal guardian;³³ the Institutional Review Board approved recruiting these individuals without parental permission. Two-hundred two participants aged 10 to 17 years were recruited. Because interviewers worked through community partners, the number of potential participants or their parents who refused to participate is not known.

2.3 Data Collection

The survey interview questionnaire was developed in English and translated to Spanish. Items from existing questionnaires and scales were used when available. The Youth and Professional Advisory Committees reviewed the English and Spanish questionnaires for content and wording. Pre-test interviews were completed by members of the Youth Advisory Committee and with youth who had formerly worked in agriculture. Questionnaire item wording was revised based on feedback received during pretesting. The final interview questionnaire was designed to be completed within 45 minutes. Interviews were completed with tablets using REDCap (Research Electronic Data Capture), a secure web-based system, to record data.³⁴

2.4 Measures

Personal and work characteristics included in this analysis were gender, and age in the categories 10–13 years, 14–15 years, and 16–17 years, and speaks English (yes, no). Region

of North Carolina in which the participant lived and worked had the values eastern and western North Carolina, where eastern North Carolina included 14 counties along and east of the I-95 corridor (Bladen, Columbus, Cumberland, Duplin, Greene, Halifax, Lenoir, Nash, Pender, Pitt, Robeson, Sampson, Wayne, and Wilson), and where western North Carolina included six western counties (Burke, Cleveland, Gaston, Henderson, Lincoln, and Rockingham). Migrant worker status had the values seasonal or migrant, where a seasonal worker did not change residence for agricultural work, and a migrant worker changed residence from state to state for agricultural employment. Works with an adult relative was a dichotomous measure indicating whether the participant works with a parent, aunt, or uncle. Crops in which participants worked in the week previous to the interview were limited to those in which at least 15% of the participants worked, including tobacco, berries, and tomatoes. The number of weeks worked in the last three months had the values 1–2 weeks, 3–4 weeks, 5–7 weeks and 8–12 weeks.

Work safety culture behavioral elements included the specific dichotomous measures: not ridden in the back of an uncovered truck at work; ever wore safety goggles when doing farm tasks; worn a seatbelt if rode in work vehicles; wore a respirator if worked around chemicals or dust; and wore earplugs or muffs if worked around noisy machinery. Appropriate work clothing wore most or all of the time included the dichotomous indicators long pants, hat, gloves, boots, sunscreen, short sleeve or sleeveless shirt, and socks over arms (child farmworkers put socks on their arms for added sun protection). A sum of appropriate work clothing wore was calculated with potential values ranging from 0 to 7.

The first situational elements included whether the participants reported receiving any training to work safely with tools, machinery, and pesticides, and if they referred to formal or Worker Protection Standard³ pesticide training. Further measures indicated whether training in domains of tools, machinery, pesticides, or WPS was provided by a supervisor (farm owner or contractor). Work piece-rate indicates whether the participant reported ever working piece-rate.³⁵ Finally, field sanitation services included dichotomous indicators of having water for washing, soap, disposable towels, supervisor provided water good enough to drink, separate cups, and private toilets always available. A sum of field sanitation services was calculated with potential values ranging from 0 to 6. The final measure is whether the participant had to provide own drinking water.

The work safety culture psychological elements included three measures: Safety/Risk Attitudes, Vulnerability Scale, and Perceived Work Safety Climate Scale. The Safety/Risk Attitudes included four items adapted from a questionnaire developed by McCurdy and Kwan^{18,36} and used in a pilot study of North Carolina Latinx child farmworkers.³⁰

Responses to the two unsafe items (No matter how hard you try to prevent them, serious injuries are going to occur on a farm or ranch; you are less likely to be injured doing farm work than other people your age doing the same work), and the two safe items (working under time pressure makes you less careful; safety precautions are important and necessary, even if they slow the job) were summed for a score of 0 to 4, with higher scores indicating a more unsafe attitude.

The Vulnerability Scale was adapted from the Vives et al.³⁷ Employment Precariousness Scale, to which were added two items from Cortina's³⁸ sexual harassment instrument. The eight items included in the Vulnerability Scale included whether for their current job participants were made to feel that they could be easily replaced by a boss or supervisor; were afraid of being fired, even though they nothing wrong; were concerned about their safety on the job, but were afraid to voice concern; could not protect themselves from being treated unfairly at work; were treated in an unfair just way because of age, race, gender; were treated in a demanding or violent manner; someone stared inappropriately at private parts of their body; and someone made a remark about their body parts covered by a swimsuit. The yes/no responses were summed for scores ranging from 0 to 8, with high scores indicating greater perceived vulnerability. The Cronbach's Alpha was 0.65.

The Work Safety Climate Scale is adapted from that developed by Gillen et al.³⁹ and used in previous research with Latinx child farmworkers.^{30,40} This scale has two components and provides two separate measures. The first measure is based on 9 items to which participants can agree or disagree. Items include such statements as: workers' safety practices are very important to the boss/supervisors; workers receive instructions on safety when hired; proper safety equipment is always available; and taking risks is part of my job. The responses are summed and values can range from 0 to 9, with higher scores indicating better work safety climate. The Cronbach's Alpha for this analysis was 0.71. The second measure uses a single item addressing how participants perceive their supervisors' concern for their safety. The three response categories are: supervisors do as much as possible to make my job safe; they could do more to make my job safe; they are only interested in doing the job fast and cheaply.

2.5 Analysis

We used descriptive statistics, means and standard deviations (SD) for continuous variables and frequencies and percentages for categorical variables, to describe the personal and work characteristics and work safety culture measures for the overall sample. Bivariate associations of personal and work characteristics with work safety culture elements were assessed using either chi-square tests (Fisher's exact tests when appropriate) for discrete work safety outcomes or analysis of variance (ANOVA) for continuous work safety outcomes. All analyses were conducted using SAS 9.4 (Cary, NC). A p value of less than 0.05 was considered statistically significant.

3 RESULTS

3.1 Participant Personal and Work Characteristics

Participants included female (37.6%) and male (62.4%) Latinx child farmworkers (Table 1). These child farmworkers were aged 10–13 years (21.3%), 14–15 years (31.7%), and 16–17 years (47.0%). Most (77.7%) lived in eastern North Carolina, with 22.3% living in western North Carolina. Most (84.2%) spoke English. Fewer than one-in-five (17.8%) were migrant workers. Most (59.9%) worked with an adult relative. In the week before their interviews, most (57.4%) had worked in tobacco, with 25.7% having working in berries, and 16.3% in tomatoes. About one-in-five (19.8%) had worked 1–2 weeks in farm work during the

previous three months, with 35.2% having worked 3–4 weeks, 27.7% having worked 5–7 weeks, and 17.3% having worked 8–12 weeks.

3.2 Overall Work Safety Culture

Behavioral elements: Most (74.3%) of the child farmworkers had not ridden in the back of an uncovered truck while engaged in farm work in the previous 12 months (Table 2), however, few (5.5%) had worn safety goggles when doing farm tasks. Fewer than half (48.0%) of those who rode in a work vehicle had worn a seatbelt, 9.4% of those working around chemicals or dust had worn a respirator, and 17.3% of those working around noisy machinery had worn earplugs. Most wore long pants (87.2%) and hats (73.8%) most or all of the time when working. Fewer than half wore gloves (47.5%) or boots (37.1%), and less than one-fifth wore sunscreen (17.3%). Few (15.3%) wore short sleeved shirts (15.3%), and 7.4% wore socks on their arms. The mean number of appropriate work clothing items was 3.55.

Situational Elements: Fewer than half (40.6%) of the child farmworkers reported being trained to work safely with tools, and 23.8% indicated that this training was provided by a supervisor (farm owner or contractor) (Table 3). About one-quarter (24.3%) reported training for working around machinery, with 15.8% indicating that this training was provided by a supervisor. About one-quarter (26.0%) reported receiving pesticide safety training, with 14.4% indicating that this training was provided by a supervisor. Only 7.9% referred to formal or Worker Protection Standard (WPS) training.

One-third (33.7%) reported having ever worked for piece-rate. Field sanitation services were seldom provided. About one-third (37.1%) reported water for washing was always available at the job site, with 19.8% reporting that soap was always available, and 16.3% reporting disposal towels were always available. Little more than half (57.9%) stated that their supervisor always provided water good enough to drink, and 38.6% reported that separate drinking cups were always available. Forty-four percent noted that private toilet were always available. The mean number of field sanitation services available was 2.4. Many (43.6%) reported providing their own drinking water.

Psychological Elements: The child farmworkers were mixed in their safety/risk attitudes (Table 4). Many agreed with the unsafe attitudes that serious injuries would happen on a farm no matter how hard one tried to prevent them (65.0%), and that they were less likely to be injured than others their age (49.5%). Most also agreed with the safe attitudes that working under pressure makes one less careful (69.8%), and that safety precautions are important even if they slow the job (94.1%). The mean poor safety/risk attitudes was 1.49.

The child farmworkers did not report substantial feelings of vulnerability due to their work. For example, 15.4% indicate that they had been made to feel that one could be easily replaced, and 12.4% indicated that they were afraid of being fired, even though they had done nothing wrong. Very few indicated that they had been stared at inappropriately (3.0%) or that someone had made a remark about a private part of their body (0.5%). The mean vulnerability score was 0.58.

The mean work safety climate score of 3.73 was low. Although over half of the child farmworkers reported that safety practices were important to their supervisors (58.4%), and that workers were regularly made aware of dangers (54.0%), only 51.0% indicated that they received safety instructions when hired, 35.6% reported being praised for safe conduct, and 16.3% reported regular safety meetings. Many felt that taking risks was part of the job (49.5%), and 43.6% felt that it was very likely that they would be injured at work in the next 12 months. One-third (32.7%) felt that their supervisor does as much as possible to make the job safe, 45.5% felt they could do more to make the job safe, and 21.8% felt their supervisor was only interested in doing the job fast and cheaply.

3.3 Associations of Personal and Work Characteristics with Work Safety Culture Elements

The personal characteristics gender and age were not significantly associated with any of the work safety culture elements. Several other personal and work characteristics, including region, migrant worker status, working with adult relatives, and working in tobacco or tomatoes, were consistently associated with the work safety culture elements.

Behavioral Elements: Wearing appropriate work clothing was associated with several child farmworker personal and work characteristics (Table 5). Those who worked in eastern North Carolina (3.68) versus western North Carolina (3.11), who did not speak English (3.93) versus who did (3.48), who were seasonal (3.65) versus migrant (3.11), and who did not work with an adult relative (3.91 versus 3.31) wore significantly more appropriate work clothing. Those who worked in tobacco (3.91 versus 3.08) wore significantly more appropriate work clothing, and those who worked in berries (3.00 versus 3.75) and tomatoes (3.09 versus 3.64) wore significantly less appropriate work clothing.

Situational Elements: Child farmworker characteristics were associated with safety training, working piece-rate, and the presence of field sanitation services (Table 6). More child farmworkers in the western North Carolina, who did not speak English, who were migrant workers, and who worked with an adult relative than their counterparts received safety training for tools, machinery, and pesticides. Fewer of those working in tobacco received safety training for tools, machinery, or pesticides, and more of those working in tomatoes received safety training for tools, machinery, and pesticides. Fewer of those working in berries received pesticide safety training. More of those working more weeks received safety training for machinery and pesticides than did those working fewer weeks.

Working at piece-rate was significantly more common among those who worked in western versus eastern North Carolina (62.2% versus 25.5%), who did not speak English (53.1% versus 30.1%), who were migrant workers (63.9% versus 27.1%), and who worked with an adult relative (47.9% versus 12.4%). More of those who did not work in tobacco (62.8% versus 12.1%) but who worked in berries (75.0% versus 19.3%) or tomatoes (63.6% versus 27.8%), and who worked more weeks (51.4% for those working 8–12 weeks versus 30.0% for those working 1–2 weeks) also worked piece-rate. The number of field sanitation services was greater for those working in western North Carolina (3.00 versus 1.89), who were migrant workers (3.25 versus 1.89), who did not work in berries (2.47 versus 1.17),

who did work in tomatoes (3.24 versus 1.92), and who worked more weeks (2.49 for those working 8–12 weeks versus 1.43 for those working 1–2 weeks) than their counterparts.

Psychological Elements: Those working in western North Carolina (1.80 versus 1.41), who were migrant workers (1.83 versus 1.42), and who worked in tomatoes (1.85 versus 1.42) had more unsafe attitudes (Table 7). The association of weeks worked with safety/risk attitudes is not linear; those working the 1–2 weeks and 8–12 weeks had the higher scores (1.60 and 1.74, respectively), with those working 3–4 weeks having a mean score of 1.52, and those working 5–7 weeks having a mean score of 1.23).

None of the participant personal or work characteristics were associated with the Vulnerability Index. Work Safety Climate was better among those working in western North Carolina (5.22 versus 3.30), who were migrant workers (5.69 versus 3.30), who did not work in berries (4.07 versus 2.75), and who did work in tomatoes (5.60 versus 3.36) than among their counterparts. Similarly, significantly more of those working in western North Carolina (60.0% versus 24.8%), who were migrant workers (61.1% versus 36.5%), who did not work in tobacco (41.8% versus 25.9%), who did not work in berries (34.7% versus 29.9%), and who did work in tomatoes (57.6% versus 27.8%) than their counterparts felt that their supervisor was doing as much as possible to make their jobs safe.

4 DISCUSSION

The work culture on North Carolina farms that employ Latinx child farmworkers places limited value on safety. Many of the child farmworkers engage in unsafe work behaviors, and they often do not wear appropriate work clothing. Few receive safety training, even required pesticide safety training.⁴ Required field sanitation services⁴⁰ are often not available to them. Many have unsafe attitudes and perceive a weak work safety climate, yet do not feel vulnerable. The precarious safety culture on the farms employing Latinx child farmworkers places them at risk for occupational injury and illness that can have lasting effects on their development and health.^{4,23}

These results are similar to those of earlier analyses of pilot data describing the work safety culture experienced by Latinx child farmworkers.^{30,40} These pilot analyses also found that Latinx child farmworkers engaged in unsafe work behaviors, seldom received safety training, had mixed safety attitudes, and perceived that the safety climate where they worked was poor.

These statistical patterns reflect the qualitative analyses of Quandt et al.²⁰ on the organization of work and of Arcury et al.¹⁹ on work safety culture among Latinx child farmworkers. In in-depth interviews, the Latinx child farmworkers described the extensive work demands that they experienced, including the need to work quickly and take risks by working in excessive heat, lifting heavy loads, and working with machinery.²⁰ They also felt that they had little control over their work environment, laboring with the fear of being fired, having wages withheld, and being yelled at. They had some family support, but less so as they got older. The children understood that although parents wanted them to be safe, they observed that safety was important to only a few of their supervisors and coworkers.¹⁹ Most

of the child workers noted that they received little formal training, and most of that formal training was in how to complete work tasks. This training was more often provided by parents and co-workers than by supervisors. Several children noted that the only safety training they received was the imperative to “be careful.”

Work safety culture has not been addressed directly by other research with child farmworkers. This research does reflect several components of work safety culture, and also indicates that the work safety culture that child farmworkers experience is wanting. For example, several analyses have reported on situational elements of work safety culture and found that safety training for child farmworkers is limited,^{2,14–17} that they often do not wear appropriate work clothing and personal protective equipment,¹³ and that adherence to field sanitation regulations where they work is incomplete.^{2,14} For the behavioral element of work safety culture, analyses report that child farmworkers often engage in hazardous tasks.^{18,23} Work safety climate, a psychological element of work safety culture, perceived by the Latinx child farmworkers is similar to the low work safety climate reported by Latinx adult farmworkers.^{28,42}

The research that has considered the work safety culture of children working on farms owned by their families is also limited,²⁹ and indicates that these children commonly take risks, and that safety consciousness and safety knowledge are limited. More importantly, the general literature on children working on farms owned by their families indicates that parents do not want any interference in how they supervise their children, although their actual training and supervision of their children is limited.^{43–45}

This analysis reveals important patterns in the regional variability of the work safety culture experienced by Latinx child farmworkers in North Carolina. Analysis of the personal and work characteristics of participants in *The Child Farmworker Study* found two ideal types among these child farmworkers.³¹ Latinx child farmworkers in western North Carolina were more likely to be migrant, foreign born, and have limited English fluency. Tomatoes are a major crop in western North Carolina. Latinx child farmworkers in eastern North Carolina were more likely to be seasonal workers, who were born in the United States, and speak English fluently. Tobacco is a major crop in eastern North Carolina. These western and eastern North Carolina ideal types also differ in the dimensions of work safety culture they experience. Those who work in western North Carolina more often receive safety training (though far from all of them receive such training), receive more field sanitation services, and experience a better work safety climate (though 22.2% state that their supervisor is only interested in going the job fast and cheaply rather than in safety). Those who work in eastern North Carolina wear more appropriate work clothing, fewer ever work piece-rate (though a quarter have worked piece-rate), and they have fewer unsafe work attitudes. These associations among farming system, personal characteristics, and work safety culture indicate that more locale specific research is needed to understand the work safety culture experienced by child farmworkers, and that efforts to improve child farmworker work safety culture must consider this variability.

Working with adult relatives also has conflicting associations with work safety culture. More of those working with adult relatives report receiving safety training, which is often provided

by these adult relatives.¹⁹ However, they wear less appropriate work clothing, more work piece-rate and they have fewer field sanitation services. They have more unsafe work attitudes, and they have a lower perceived work safety climate, with more feeling that their supervisor is only concerned with getting the job done fast and cheap. Qualitative analysis indicates that child farmworkers get some work support from parents,²⁰ and that, in addition to providing much of their safety training, adult relatives emphasize the need to work safely.¹⁸ The role of working with family members in work safety needs to be examined further.

4.1 Limitations

The results of this analysis should be interpreted within its limitations. The sample was not randomly selected. Organizations that serve the North Carolina farmworker population assisted in recruiting participants known to them; therefore, child farmworkers living in counties without such organizations had a small chance of being recruited. However, no list of child farmworkers exists, and basing recruitment in schools would exclude migrants and those who might have left school. Recruiting child farmworkers across multiple counties enhances the samples' representativeness. A response rate cannot be determined based on the recruitment strategy. The study focuses on Latinx child farmworkers living in one state, limiting the generalizability of the results. The Cronbach's Alpha for the Vulnerability Scale was 0.65 and for the Work Safety Climate Scale was 0.71; these indicators of reliability are not very high and should limit the interpretation of the results.

4.2 Conclusions

Even with its limitations, this research provides important insight into the work safety culture on farms that employ Latinx child farmworkers. The safety culture experienced by these children is inadequate, increasing their risks for immediate and chronic injury and illness. Future research needs to document the overall safety culture of child farmworkers, and to delineate the personal, regional, and farm characteristics associated with variability in this safety culture.

This research makes it apparent that efforts are needed to improve safety culture wherever child farmworkers are employed. Vulnerable workers, such as migrant and seasonal farmworkers, have limited control over the safety culture in which they work. They can attempt to work safely, but cannot control the actions of their employers or such work organization characteristics as piece-rate. These limitations on worker attempts to improve safety culture are even more problematic for child farmworkers. Age increases the vulnerability of these children. Therefore, policy and regulations that ensure a safe work environment, and the enforcement of these policies and regulations, are especially important for these vulnerable workers. Current policy and regulations, and their enforcement, are not providing a safe environment for children (or adults) working on farms in the United States. Training alone will not improve the unsafe environment in which child farmworkers labor. Although safety training is important and needed to improve safety, training must be applied to agricultural employers as well as agriculture workers, and employers must provide the tools that support safety. Policy and regulations should limit the ages at which children can be hired to work on farms, ensure that they are trained for safety, and limit the hazardous tasks which they can perform. In the end, to safeguard Latinx child farmworkers from

occupational injury and illness, current policy used for children working in every other industry must be applied to agriculture.

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Table 1

Participant Personal and Work Characteristics, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Personal and Work Characteristics	n (%)
Gender	
Female	76 (37.6)
Male	126 (62.4)
Age (in years)	
10–13	43 (21.3)
14–15	64 (31.7)
16–17	95 (47.0)
Region of North Carolina	
East	157 (77.7)
West	45 (22.3)
Speaks English	170 (84.2)
Migrant worker	36 (17.8)
Works with adult relatives	121 (59.9)
Crops worked in past week	
Tobacco	116 (57.4)
Berries	52 (25.7)
Tomatoes	33 (16.3)
Work in last 3 months	
1–2 weeks	40 (19.8)
3–4 weeks	71 (35.2)
5–7 weeks	56 (27.7)
8–12 weeks	35 (17.3)

Table 2

Work Safety Culture Behavioral Elements: Work Risk Behaviors, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Behavioral Elements	n (%)
Work Safety Behaviors During the Last 12 Months	
Not ridden in the back of an uncovered truck at work (n = 202)	150 (74.3)
Ever wore safety goggles when doing farm tasks (n=202)	11 (5.5)
Wore seatbelt if rode in work vehicles (n = 123)	59 (48.0)
Wore a respirator if worked around chemicals or dust (n = 96)	9 (9.4)
Wore earplugs or muffs if worked around noisy machinery (n=52)	9 (17.3)
Wore Appropriate Work Clothing	
Long pants	177 (87.2)
Hat	149 (73.8)
Gloves	96 (47.5)
Boots	75 (37.1)
Sunscreen	35 (17.3)
Short sleeve or sleeveless shirt *	31 (15.3)
Socks on arms	15 (7.4)
Sum - Appropriate Work Clothing	
Mean = 3.55	
SD = 1.25	

* Reversed scores

Table 3

Work Safety Culture Situational Elements: Training and Field Sanitation, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Situational Elements	n (%)
Safety Training in Current Job	
Tool Use	
Any training	82 (40.6)
Training provided by supervisor	48 (23.9)
Machinery	
Any training	49 (24.3)
Training provided by supervisor	32 (15.8)
Pesticide	
Any training	53 (26.0)
Training provided by supervisor	29 (14.4)
Referred to Formal or WPS pesticide training	
Any training	16 (7.9)
Training provided by supervisor	8 (3.8)
Work Piece-Rate	68 (33.7)
Field Sanitation Services	
Water for washing	75 (37.1)
Soap	40 (19.8)
Disposable towels	33 (16.3)
Supervisor provided water good enough to drink	117 (57.9)
Separate cups	78 (38.6)
Private toilet	89 (44.1)
Sum – Field Sanitation Services	
Mean = 2.14	
SD = 1.82	
Provide Own Drinking Water	88 (43.6)

Table 4

Work Safety Culture Psychological Elements: Safety Attitudes, Vulnerability, and Work Safety Climate, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Psychological Elements	n (%)
Safety/Risk Attitudes	
No matter how hard you try to prevent them, serious injuries are going to occur on a farm or ranch (unsafe)	131 (65.0)
You are less likely to be injured doing farm work than other people your age doing the same work (unsafe)	100 (49.5)
Working under time pressure makes you less careful (safe) *	141 (69.8)
Safety precautions are important and necessary, even if they slow the job (safe) *	190 (94.1)
Sum (high score = greater unsafe attitude)	
Mean = 1.49	
SD = 0.84	
Vulnerability Scale	
You were made to feel that you could be easily replaced by a boss or supervisor	31 (15.4)
You were afraid of being fired, even though you did nothing wrong	25 (12.4)
You were concerned about your safety on your job, but were afraid to voice your concern	17 (8.4)
You could not protect yourself from being treated unfairly at work	16 (7.9)
You were treated in an unfair just way because of age, race, gender	13 (6.4)
You were treated in a demanding or violent manner	10 (5.0)
Someone stared inappropriately at private parts of your body	6 (3.0)
Someone made a remark about your body parts covered by a swimsuit	1 (0.5)
Scale (high score = greater perceived vulnerability)	
Mean = 0.58	
SD = 1.11	
Perceived Work Safety Climate Scale	
Workers' safety practices are very important to the boss/supervisors.	118 (58.4)
Workers are regularly made aware of dangerous work practices or conditions.	109 (54.0)
Workers are regularly praised for safe conduct.	72 (35.6)
Workers receive instructions on safety when hired.	103 (51.0)
Workers attend regular safety meetings.	33 (16.3)
Proper safety equipment is always available.	65 (32.2)
Workers have almost total control over personal safety. *	164 (81.2)
Taking risks is a part of my job. *	100 (49.5)
The possibility of being injured at work in the next 12 months is very likely. *	88 (43.6)
Scale (higher score = greater perceived safety climate)	
Mean = 3.73	
SD = 2.33	
How much do supervisors seem to care about your safety?	
Supervisors do as much as possible to make my job safe	66 (32.7)
They could do more to make my job safe	92 (45.5)

Psychological Elements	n (%)
They are only interested in doing the job fast and cheaply	44 (21.8)

* Reverse scored.

Table 5

Association of Personal and Work Characteristics with Work Safety Culture Behavioral Element: Appropriate Work Clothing, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Personal and Work Characteristics	Mean (SE) ^a
Region of North Carolina	
East	3.68 (0.10) **
West	3.11 (0.18)
Speaks English	
Yes	3.48 (0.09) *
No	3.94 (0.22)
Migrant worker	
Seasonal	3.65 (0.10) *
Migrant	3.11 (0.21)
Works with adult relatives	
Yes	3.31 (0.13) ***
No	3.91 (0.11)
Crops worked in past week	
Tobacco	
Yes	3.91 (0.11) ***
No	3.08 (0.13)
Berries	
Yes	3.00 (0.17) ***
No	3.75 (0.10)
Tomatoes	
Yes	3.09 (0.21) ***
No	3.64 (0.09)
Work in last 3 months	
1–2 weeks	3.40 (0.20)
3–4 weeks	3.59 (0.15)
5–7 weeks	3.54 (0.17)
8–12 weeks	3.69 (0.21)

^aStandard error

*
p<.05;

**
p<.01;

p<.001

Table 6

Association of Personal and Work Characteristics with Work Safety Culture Situational Elements: Safety Training, Work Piece-Rate, and Field Sanitation Services, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Personal and Work Characteristics	Safety Training in Current Job			Work Piece-Rate	Field Sanitation Services
	Tools		Pesticides		
	n (%)	Machinery	n (%)	n (%)	Mean (SE) ^a
Region of North Carolina					
East	48 (30.6)***	21 (13.4)***	28 (17.8)***	40 (25.5)***	1.89 (0.14)***
West	34 (75.6)	28 (62.2)	25 (55.6)	28 (62.2)	3.00 (0.26)
Speaks English					
Yes	65 (38.2)	36 (21.2)*	43 (25.3)	51 (30.0)*	2.06 (0.14)
No	17 (53.1)	13 (40.6)	10 (31.3)	17 (53.1)	2.53 (0.32)
Migrant worker					
Seasonal	54 (32.5)**	24 (14.5)***	31 (18.7)***	45 (27.1)***	1.90 (0.14)***
Migrant	28 (77.8)	25 (69.4)	22 (61.1)	23 (63.9)	3.25 (0.29)
Works with adult relatives					
Yes	64 (52.9)***	39 (32.3)**	40 (33.1)**	58 (47.9)***	2.04 (0.17)
No	18 (22.2)	10 (12.4)	13 (16.1)	10 (12.4)	2.28 (0.20)
Crops worked in past week					
Tobacco					
Yes	35 (30.2)***	19 (16.4)**	27 (23.3)	14 (12.1)***	2.09 (0.17)
No	47 (54.7)	30 (34.9)	26 (30.2)	54 (62.8)	2.21 (0.20)
Berries					
Yes	23 (44.2)	10 (19.2)	8 (15.4)*	39 (75.0)***	1.17 (0.24)***
No	59 (39.3)	39 (26.0)	45 (30.0)	29 (19.3)	2.47 (0.14)
Tomatoes					
Yes	24 (72.7)***	23 (69.7)***	22 (66.7)***	21 (63.6)***	3.24 (0.31)***
No	58 (34.3)	26 (15.4)	31 (18.3)	47 (27.8)	1.92 (0.14)
Work in last 3 months					

Personal and Work Characteristics	Safety Training in Current Job			Work Piece-Rate	Field Sanitation Services
	Machinery		Pesticides		
	Tools				
	n (%)	n (%)	n (%)	n (%)	Mean (SE) ^a
1–2 weeks	7 (17.5)	6 (15.0) [*]	4 (10.0) [*]	12 (30.0) [*]	1.43 (0.28) [*]
3–4 weeks	16 (22.5)	15 (21.1)	22 (31.0)	25 (35.2)	2.14 (0.21)
5–7 weeks	11 (19.6)	13 (23.2)	14 (25.0)	13 (23.2)	2.43 (0.24)
8–12 weeks	6 (17.1)	15 (42.9)	13 (27.1)	18 (51.4)	2.49 (0.30)

^aStandard error
* p<.05;
** p<.01;
*** p<.001

Table 7

Association of Personal and Work Characteristics with Work Safety Culture Psychological Elements: Safety Attitudes, Vulnerability, and Work Safety Climate, Latinx Child Farmworkers in North Carolina, 2017 (N=202)

Personal and Work Characteristics	Safety/Risk Attitudes		Vulnerability Scale		Perceived Work Safety Climate		
	Mean (SE) ^a		Mean (SE) ^a		How much supervisors seem to care about your safety		
	Mean (SE) ^a		Mean (SE) ^a		Do much as possible to make the job safe	Could do more to make the job safe	Only interested in doing the job fast and cheaply
					n (%)	n (%)	n (%)
Region of North Carolina							
East	1.41 (0.07)	**	0.60 (0.09))		39 (24.8)	84 (53.5)	34 (21.7) ***
West	1.80 (0.12)		0.56 (0.17)		27 (60.0)	8 (17.8)	10 (22.2)
Speaks English							
Yes	1.45 (0.06)		0.78 (0.20)		53 (31.2)	81 (47.7)	36 (21.2)
No	1.72 (0.15)		0.55 (0.09)		13 (40.6)	11 (32.4)	8 (25.0)
Migrant worker							
Seasonal	1.42 (0.06)	**	0.57 (0.09)		44 (26.5)	86 (51.8)	36 (21.7) **
Migrant	1.83 (0.14)		0.67 (0.19)		22 (61.1)	6 (16.7)	8 (22.2)
Works with adult relatives							
Yes	1.63 (0.08)	**	0.60 (0.10)		45 (37.2)	45 (37.2)	31 (25.6) *
No	1.30 (0.09)		0.58 (0.12)		21 (25.9)	47 (58.0)	13 (16.1)
Crops worked in past week							
Tobacco							
Yes	1.44 (0.08)		0.70 (0.12)		30 (25.9)	68 (58.6)	18 (15.5) ***
No	1.57 (0.09)		0.51 (0.10)		36 (41.8)	24 (27.9)	26 (30.2)
Berries							
Yes	1.58 (0.12)		0.54 (0.15)		14 (29.9)	16 (30.8)	22 (42.3) ***
No	1.47 (0.07)		0.61 (0.09)		52 (34.7)	76 (50.7)	22 (14.3)
Tomatoes							
Yes	1.85 (0.15)	**	0.64 (0.19)		19 (57.6)	7 (21.2)	7 (21.2) **
No	1.42 (0.06)		0.58 (0.09)		47 (27.8)	85 (50.3)	37 (21.9)

Personal and Work Characteristics	Safety/Risk Attitudes		Vulnerability Scale		Perceived Work Safety Climate			
	Scale		Scale		How much supervisors seem to care about your safety			
	Mean (SE) ^a	Mean (SE) ^a	Mean (SE) ^a	Mean (SE) ^a	Do much as possible to make the job safe	Could do more to make the job safe	Only interested in doing the job fast and cheaply	n (%)
Work in last 3 months					n (%)	n (%)	n (%)	n (%)
1–2 weeks	1.60 (0.13) *	0.73 (0.18)	3.70 (0.27)	14 (35.0)	14 (35.0)	12 (30.0)		
3–4 weeks	1.52 (0.10)	0.56 (0.13)	3.61 (0.37)	18 (25.4)	35 (49.3)	18 (23.4)		
5–7 weeks	1.23 (0.11)	0.48 (0.15)	3.38 (0.31)	22 (39.3)	26 (46.4)	8 (14.3)		
8–12 weeks	1.74 (0.14)	0.66 (0.19)	4.60 (0.39)	12 (34.3)	17 (48.6)	6 (17.1)		

^aStandard error

* p<.05;

** p<.01;

*** p<.001