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Evidence of the "Hispanic Paradox" from the Poverty and Disability Nexus in the Hispanic Farmworker Population of the United States

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Abstract

Previous research has provided evidence for the Hispanic Paradox—the fact that Hispanics are sometimes found to have lower risk for adverse health outcomes than more economically advantaged groups. We sought to identify evidence of the Hispanic Paradox in the Hispanic farmworker population of the contiguous United States (US). We wanted to investigate if the Hispanic Paradox only applied to Hispanics of Mexican-origin or to all Hispanics. Our cross-sectional analysis used the American Community Survey (ACS) Public Use Microdata Sample (PUMS) 2009-2013 (5-year) file. A total of 60,923 farmworkers in the US mainland were included in our analysis—which represents 1,144,021 farmworkers in the US mainland. We found prevalence of and risk for disability and poverty varied significantly between racial-ethnic groups. A population-weighted multivariable logistic regression found that when compared to Non-Hispanic-Whites, Mexican-origin Hispanics and Non-Mexican-Hispanics were *less* likely to have a disability—25% and 20% respectively. We also found that when compared to Non-Hispanic-Whites, Mexican-origin Hispanics and Non-Mexican-Hispanics were *more* likely to be in-poverty—117% and 96% respectively. Our findings suggest the Hispanic Paradox applies to disability for both Mexican- and non-Mexican-origin Hispanics. Understanding causal mechanisms of the potential paradox may help identify protective factors in disablement processes.
Keywords: farmworkers; Hispanics; Mexicans; inequality; functional; disability

Introduction

The economic well-being of farmworkers has been investigated by social scientists for many decades (Hahamovitch 1997; Hansen & Donohoe 2003; Taylor et al., 2012). General research on the health, safety, and justice of Hispanic farmworkers has also been developed more recently (Arcury & Quandt 2009; Grzywacz et al., 2014; Ramos et al, 2013). Because Hispanics are commonly associated with farmworker occupations, research has paid special attention to this population. For example, researchers have investigated the health of Latina farmworkers (Arcury et al., 2015), injury among youth from Hispanic farmworker families (Arcury et al., 2014), learning ability amongst Hispanic farmworkers (Nguyen et al., 2015); work safety climate for Hispanic farmworkers with H-2A visas (Arcury et al., 2015), associations between family well-being and neighborhood characteristics amongst Hispanic farmworkers (Arcury et al., 2014), and stress factors contributing to depression (Ramos et al., 2015).

Research provides evidence for the Hispanic Paradox—the fact that Hispanics are sometimes found to have lower mortality risk than more economically advantaged groups (Franzini et al., 2001). The Hispanic Paradox has been challenged (Palloni & Morenoff, 2001) with some highlighting migrant health selectivity (salmon bias) —the hypothesis that healthy Hispanics in-migrate while unhealthy Hispanics choose not to migrate in the first place or out-migrate back to their country of origin (Crimmins et al., 2007; Hunt et al., 2003; Smith & Bradshaw, 2006). Others have provided evidence that neither the "salmon hypothesis" nor healthy migrant selectivity explains Hispanic's relative health and mortality advantage (Abraido-Lanza et al., 1999).

Others have argued the mortality advantage concentrates at lower levels of socioeconomic status (Turra & Goldman, 2007). Although controversial, research continues to find support for the Hispanic Paradox among mortality and health outcomes (Brown et al., 2007; Gómez-Puerta et al., 2014; Heck et al., 2015; Lariscy et al., 2014; Medina-Inojosa et al., 2014; Molina et al., 2014; Siordia, 2015a, 2015b). Some have explained genetic predisposition, health behaviors, and differences in diet may play a role in explaining the Hispanic Paradox (Young & Hopkins, 2014).

Unlike studies exploring mortality, examining difficulty with daily living tasks ascertains how race and ethnic statuses are associated with risk for disability. A recent study asked: Does the Hispanic Paradox extend to disability? (Hayward et al., 2014). In their analysis with multistate life tables of "life expectancy with disability", Hayward and colleagues found no racial-ethnic differences in length of disability-free life. For estimation of mortality, they used the 1989-2004 National Health Interview Survey Linked Mortality Files. For estimation of disability prevalence, they used a different data source, the 1992-2010 Health and Retirement Study, which only includes people age 50 and older. They defined disability using a single report of "any difficulty" with at least one of the following items: self-care, dressing, bed use, eating, walking, and bathing. Hayward et al (2014) did not separate Hispanics into subgroups because of their limited sample of 25,895 observations—where Hispanics made up 36% (9,319) of their analytic sample.

Our investigation builds on their investigation by using nationally representative data from 60,923 (when weighted represent 1,144,021) community-dwelling farmworkers aged 16 and above. We contribute to the Hispanic Paradox literature by assessing whether the paradox applies to disability in a population with a wider range of ages and by Hispanic sub-groups. In order to adjust for potential occupational hazards, our analysis focuses on people who report working as farmworkers—an understudied population. Unlike observations in the Health and Retirement Study, where

generalization is limited, our study uses a larger and more nationally representative sample of individuals from a wider age spectrum with a specific occupational background.

The first aim of our cross-sectional observational analysis was to delineate the sociodemographic profile of the farmworker population by geographic divisions in the US mainland. The second aim was to explore if prevalence and risk for disability differed in a statistically significant way between racial-ethnic groups. In particular, we wanted to see if the Hispanic Paradox for mortality extended to disability and if it applied to both Mexican- and non-Mexican-origin Hispanics. Thus, we explored if Mexican-origin Hispanics and Non-Mexican-origin Hispanics had *lower* prevalence and risk for being disabled than Non-Hispanic-Whites while simultaneously having *greater* prevalence and risk for being in-poverty. We determined if evidence from the poverty and disability nexus was provided, that we could argue the Hispanic Paradox on mortality extends to disability for the Hispanic farmworker population of the US mainland.

Methods

Data & Sample

The analysis used information on individuals from the American Community Survey (ACS) Public Use Microdata Sample (PUMS) 2009-2013 (5-year) file. From the 15,450,262 observations in the Microdata Sample, a total of 60,923 individuals where selected for the analysis. The sample only includes those aged 16 and above, residing in the contiguous US, and who identify their occupation as "miscellaneous agricultural workers, including animal breeders". We elected the age16 threshold as it represents the age at which number of hours worked and types of duties are no longer limited for farmworkers in the US. Note Occupations Cross Classification (OCC) codes are the only way to identify farmworkers in ACS PUMS files. Because we assume the majority of individuals under the selected OCC code ("6050") are agricultural workers, we refer to them as "farmworkers". In the data, occupation type is recoded for 2009 data to 2002 OCC codes, and 2010 through 2013 to 2010 OCC codes.

Disability

The ACS ascertains difficulty with daily tasks by measuring the following six functional tasks: self-care= Does this person have difficulty dressing or bathing?; independent-living= Because of a physical, mental, or emotional condition, does this person have difficulty doing errands alone such as visiting a doctor's office or shopping?; ambulatory= Does this person have serious difficulty walking or climbing stairs?; hearing= Is this person deaf or does he/she have serious difficulty hearing?; vision= Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?; cognitive= Because of a physical, mental, or emotional conditions, does this person have serious difficulty concentrating, remembering, or making decisions? A person is coded as being "disabled" if a "yes" response is given for one or more of these questions. We computed population-weighted prevalence of disability and modeled population-weighted likelihood of being disabled. In closing, we discuss how future studies may disambiguate our approach by modeling each of the six difficulties with functional tasks separately.

Poverty Status

The US federal government determines "poverty thresholds" by family types to determine if an individual is in- or out-of-poverty (Siordia & Leyser-Whalen, 2014). Although the thresholds are annually adjusted for inflation using the Consumer Price Index, they do not vary geographically, and as such, fail to account for relative cost of living in area of residence. ACS PUMS files provide a variable for an individual's "income-to-poverty ratio". An income-to-poverty ratio of 100% indicates the individual (or his/her family unit) has an annual income equal to 100% of their poverty threshold— i.e., they are in poverty by the US federal government threshold standards. For example, the poverty threshold for a family of four in 2013 was $23,550. We describe people as being "in-poverty" by using an income-to-poverty ratio of $\leq$ 150% as a way to account for the lack of geographic variability in the measure. We discuss limits with our measure of poverty in closing.

Race & Ethnicity

In the US, individuals are asked to identify their "race" and their "ethnicity". Individuals can identify with a single-race (e.g., white, black) or multiple races (e.g., white and Asian). For ethnicity, individuals must declare if they are of Hispanic origin or not. Hispanics are allowed to be of any race. Thus, it is imperative to differentiate between "Non-Hispanic-Whites", "Hispanic-Whites", and other groups by race and ethnicity conjointly (Siordia, 2014). The US federal government does not view either of these, race or ethnicity, as representing biological groups. Rather, the labels are used simply to meet legal mandates for identifying minority groups within the US. The US Census Bureau collects race and ethnicity information using rules set by the US Office of Management and Budget (OMB). Hispanics are defined as persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race (Siordia & Farias, 2013). We group individuals into the following groups: Non-Hispanic-White (NHW) of single-race; Non-Hispanic-Black (NHB) of single-race; Non-Hispanic-Other (NHO) of single- and multi-race; Hispanics of Mexican-origin (MEX); and Hispanic of non-Mexican-origin (HNM). Guided by previous work, we treat Non-Hispanic-Whites at the "majority group" and least socioeconomically marginalized group in the US.

Covariates

When estimating risk for disability and poverty, our models adjusted for age, sex, marital status, legal status (US-born or naturalized), educational attainment (has less than a high school diploma), and whether person resided in or outside the state of California. We created four age-groups by using approximate age quartiles in the full sample. We selected California because 28% of all farmworkers in the US population reside in that state. In closing, we discuss limitations within the data from not having measures of comorbidity and body composition.

Statistical Approach

We provide population-weighted counts and descriptive statistics. We computed the population-weighted prevalence of disability and poverty and tested for statistically significant differences using all groups pairwise comparisons and specific two group t-tests. We also conducted two population-weighted multivariable logistic regression using SURVEYLOGISTIC procedures in SAS® 9.3—we did not include a stratum or cluster variable and used "PWGTP" as the weight variable. One regression predicted likelihood of being disabled and the other likelihood of being in-poverty. Because we are using population-weighed procedures, our findings may be generalized (with caution) to the farmworker population in the contiguous US.

Results

Demographic Profile by Geographic Division

Table 1 shows the population-weighted distribution of the analytic sample (n=1,144,021) by geographic division of the US. The Pacific region is home to the greatest number of farmworkers (405,026), highest percentage of those who have not completed high school (73%), lowest percentage of US citizens (30%), and least likely to be disabled (6%). The New England region has the fewest farmworkers (23,522). On average they tend to be younger (33 years of age) than in other regions and are more likely to be female (36%). Within the West North Central region the vast majority of farmworkers are US citizens (89%) and only about one-third have not completed high school.

Table 2 shows the population-weighted descriptive statistics of the analytic sample (n=1,144,021) stratified by race and ethnicity. Hispanics, both Mexican and non-Mexican Hispanics, had a higher percentage of in poverty than any racial group, were least likely to be disabled, and were least likely to be US citizens. Mexicans were most likely to be married (54%), least likely to have completed high school (77%), and most likely to live in California (51%). In terms of age, over 40% of Non-Hispanic Whites were under age 25 whereas 45% of Non-Hispanic Blacks were over age 46.

Race-Ethnic Disparities in Prevalence of Disability & Poverty

After finding that an all pairwise comparison test on group mean differences on disability prevalence was statistically significant, we used individual two-group comparisons t-test between NHW (11%) and MEX (6%) and found prevalence of disability was different at statistically significant of ≤0.001. A separate two-group comparisons t-test between NHWs (11%) and HNMs s (7%) also found prevalence of disability was different at statistically significant of ≤0.001. In similar fashion, after finding that an all pairwise comparison test on group mean differences on prevalence of poverty was statistically significant, we used individual two-group comparisons t-test between NHW (29%) and MEX (58%) and found a statistically significant difference of ≤0.001 in prevalence of poverty. A separate two-group comparisons t-test between NHWs (29%) and HNMs (56%) also found prevalence of poverty differed in a statistically significant way at the ≤0.001 level. Thus, when compared to NHWs, both MEXs and HNMs have both a *lower* prevalence of disability and a *higher* prevalence of poverty. This finding is paradoxical since risk for disability is commonly found to be accompanied by risk for poverty.

Race-Ethnic Disparities in Risk for Disability

Table 3 shows the results from the population-weighted multivariable logistic regression predicting the likelihood of being disabled. After adjusting by important covariates for disability available in the data, we found that when compared to NHWs, MEXs were 26% *less* likely to have a disability. In addition, HNMs were 20% *less* likely to have a disability when compared to NHWs. These findings suggest Hispanics are at lower risk for disability when compared to the race-majority-group—regardless of whether they are of Mexican-origin or not. We also found being a female (-10%), married (-24%), residing in California (-19%), and younger age (e.g., age ≤ 25 = -83%) were associated with *lower* risk for disability. In contrast, being a US citizen (118%), not having a high school education (57%), being a NHB (33%) or a NHO (48%) was associated with a *greater* risk for disability.

Race-Ethnic Disparities in Risk for Poverty

Table 3 shows the results from the population-weighted multivariable logistic regression predicting the likelihood of being in-poverty. After adjusting by important covariates for poverty available in the microdata, we found that when compared to NHWs, MEXs were 117% *more* likely to be in-poverty. In similar fashion, HNMs were 96% *more* likely to be in-poverty when compared to NHWs. These findings suggest Hispanics are at higher risk for being in-poverty when compared to NHWs—regardless of whether they are of Mexican-origin or not. We also found being a married (-28%), US citizen (-38%), and youngers ages (e.g., age < 25 = -30%) were associated with *lower* risk for being in-poverty. By contrast, being a female (37%), not having a high school education (14%), being a NHB (193%) or a NHO (87%) was associated with a *greater* risk for being in-poverty.

Discussion

As would have been indicated by prevalent findings from empirical research on the disability and poverty nexus, NHBs and NHOs are simultaneously at greater risk for disability and poverty. These findings imply factors associated with economic deprivation and adverse health are operating in similar fashion within NHBs and NHOs to influence the formation of "global disadvantage". Paradoxically, but in support of previous work finding a Hispanic advantage for health and disadvantage for economic status, we found global disadvantage is absent amongst Hispanics/as—regardless of whether they are of Mexican-origin or not. Despite their greater risk for being in-poverty, Hispanic farmworkers have a decreased risk of disability. The health advantage amongst Hispanics may be partially driven by health behaviors (e.g., physically active occupation), strong networks of social support, and survey methodology issues with how Hispanic males report physical well-being in the context of masculinity (e.g., machismo). Thus, it is plausible that disability may be underreported amongst Hispanics because of cultural stereotypes.

There are some limitations in our investigation. For example, because the variables are not available in the data, we did not account for body composition or comorbidity. Future work should seek to replicate our analysis while accounting for these important confounders for disability. Our study is also limited in that disability is measured using six different questions over a wide range of functional tasks. Future studies may disambiguate risk for disability by race-ethnicity by separately modeling difficulties with self-care, independent-living, ambulatory, hearing, vision, and cognitive tasks. Our measure of poverty can be challenged as economic deprivation is directly associated with relative deprivation (Smith & Pettigrew, 2015). In addition, the income-to-poverty ratio we used is based on methods originally developed in 1963-1964. The approach computed poverty thresholds based on needs of basic food products. Thus, our measure or poverty may be argued to be extremely conservative—i.e., only capturing those in very deep poverty. We attempted to adjust for this flaw by using a 150% income-to-poverty ratio rather than the commonly used 100% ratio for identifying those in-poverty.

More importantly, our statistical analysis is unable to account for bias introduced by individual participant surveys administered by the US federal government (Singer et al., 1993). According to the "leverage-salience theory of survey participation", individuals are influenced by the survey topic when making the decision to participate or not (Groves et al., 2004). The multiple forms of bias from person nonresponse (Olson, 2006) may influence who is in our analytic sample—and by extension, may bias our findings towards or away from the null in unknown ways. Analysis from the Belgian National Health Survey found lower rates of survey participation within individuals in lower socioeconomic status (Demarest et al., 2012). This last point is important, as those at lower socioeconomic strata may be simultaneously at greater risk for disability and poverty—regardless of their Hispanic status due to types of occupations in which they may be employed. Our data does not allow us to investigate how survey participation plays a role in the estimation of risk profiles by race and ethnicity. There have been some accounts of an underreporting of the Hispanic population in the US Census Bureau data (Martin, 2002; Lowenthal, 2006). However, according to the US Census Bureau—the creators of the ACS data used in this analysis—the housing unit response rate in 2013 was 97.1% (ACS, 2013). Finally, our study does not account for any cultural belief and value systems such as the role of machismo in reporting disability among Hispanic farmworkers.

Notwithstanding limitations, our study clearly shows evidence of Hispanic Paradox amongst Mexican- and Non-Mexican-origin Hispanics. Investigating why Hispanic farmworkers have better health profiles than Non-Hispanic-Whites may provide novel insights in forming interventions aimed at mitigating disparities in disability. Despite the grim truth that Hispanics may be at greater risk for economic deprivation, they may have unintentionally found mechanisms capable of mitigating factors capable of accelerating the onset or progression of disablement processes. Identifying the mechanisms by which Hispanics combat unjustly imposed health risks may help positively impact public health. If the Hispanic paradox is valid, then public health professionals may be able to develop interventions to prevent disability by learning from the community-dwelling farmworker population.

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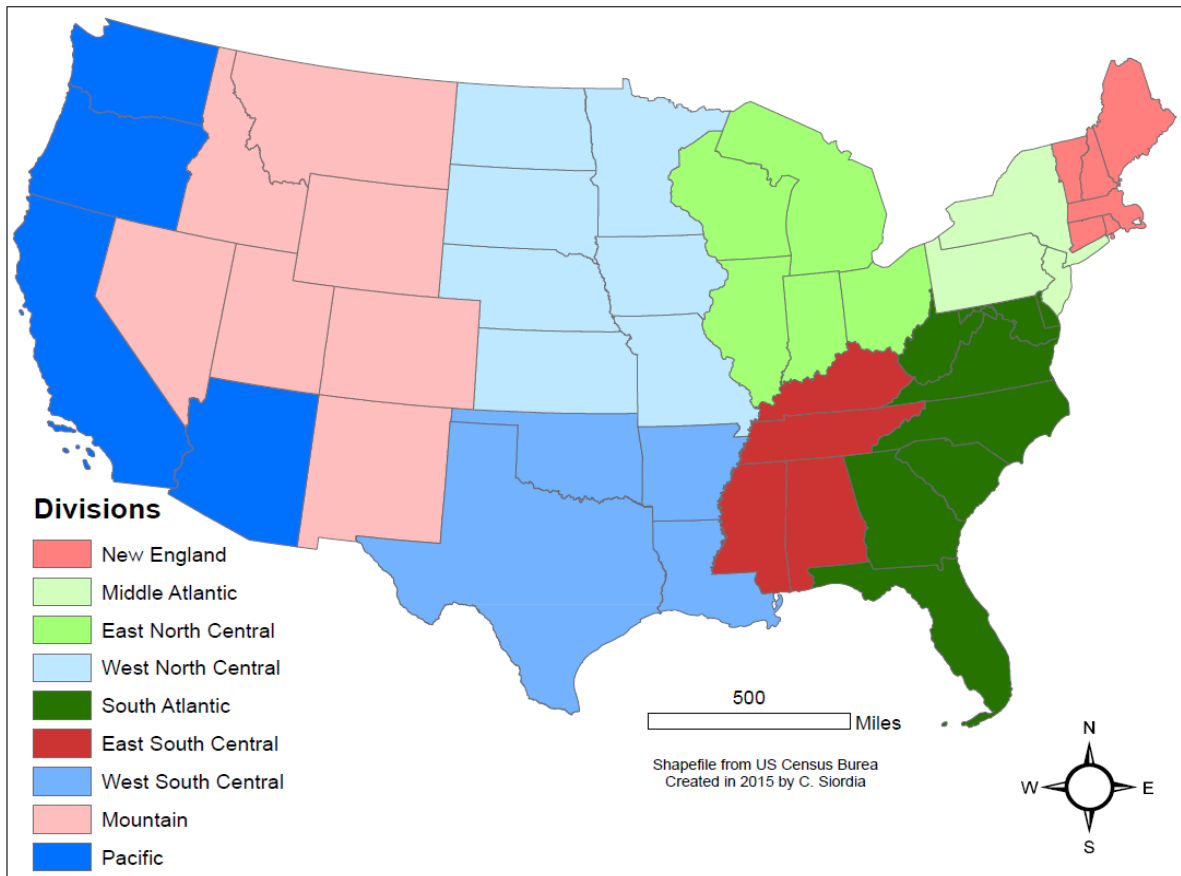
Annexure

Figure 1 Geographic divisions within the US mainland

Table 1
Population-weighted estimates by geographic division

	Total	**x̄ Age**	**Female**	**Citizen**	**Married**	**In-Poverty**	**Disable**	**No HS**[1]
New England	23,522	33	36%	87%	27%	32%	11%	34%
Middle Atlantic	60,767	35	28%	75%	39%	37%	7%	43%
East North Central	130,659	34	24%	84%	35%	33%	8%	39%
West North Central	124,038	36	17%	89%	41%	27%	9%	31%
South Atlantic	148,673	38	25%	55%	41%	54%	10%	56%
East South Central	48,374	38	16%	77%	38%	48%	14%	47%
West South Central	110,330	39	15%	72%	48%	45%	14%	51%
Mountain	92,632	38	20%	64%	47%	44%	9%	49%
Pacific	405,026	37	28%	30%	51%	56%	6%	73%
Total	1,144,021	37	24%	58%	44%	46%	9%	55%

[1] Have less than a high school diploma or GED

Table 2
Population-weighted characteristics by race and ethnicity

	Non-Hispanic			Hispanic	
	White	**Black**	**Other**	**Mexican**	**Other**
Weighted count	467,896	45,395	27,929	547,409	55,392
Disabled	11%	19%	14%	6%	7%
In-poverty	29%	55%	47%	58%	56%
Female	23%	15%	28%	25%	24%
Married	36%	25%	39%	54%	37%
US-born or naturalized	99%	93%	77%	22%	31%
No HS[1] diploma	29%	49%	43%	77%	69%
Resides in California	4%	3%	24%	51%	21%
Age < 25	42%	20%	33%	22%	26%
Age 26-35	15%	18%	17%	28%	32%
Age 36-45	12%	17%	16%	24%	21%
Age > 46	32%	45%	34%	26%	21%

[1]HS=High School

Table 3
Population-weighted multivariable logistic models

	Likelihood of being disable			Likelihood of being in-poverty		
	OR[1]	**%C[2]**		**OR1**	**%C[2]**	
Non-Hispanic-White	1.00	Ref		1.00	Ref	
Non-Hispanic-Black	1.33	33%	***	2.93	193%	***
Non-Hispanic-Other	1.48	48%	***	1.87	87%	***
Mexican-origin Hispanic	0.74	-26%	***	2.17	117%	***
Non-Mexican Hispanic	0.80	-20%	*	1.96	96%	*
Female	0.90	-10%	*	1.37	37%	*
Married	0.76	-24%	***	0.72	-28%	***
US-born or naturalized	2.18	118%	***	0.62	-38%	***
No HS[3] diploma	1.57	57%	***	1.14	14%	***
Resides in California	0.81	-19%	***	1.04		
Age $\leq$ 25	0.17	-83%	***	1.30	30%	***
Age 26-35	0.28	-72%	***	1.64	64%	***
Age 36-45	0.43	-57%	***	1.61	61%	***
Age $\geq$ 46	1.00	Ref		1.00	Ref	

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$; [1] Odds ratio; [2] Percent change=[100×(odds radio-1)]; [3] High School;