

BACKGROUND & PURPOSE

Unintentional injuries are a major health problem among teenagers in the US. Those that occur in the work setting are the fourth most common among youth ages 10-19. While there is much research evidencing socioeconomic disparities in risk of a variety of unintentional injuries among youth (i.e., pedestrian, recreational), little has considered whether such disparities exist in the risk of work-related injuries, which affect between 138,000 and 200,000 youth annually.

THE PURPOSE OF THIS STUDY was to examine the relationship between socioeconomic status (SES) and the likelihood of reporting work-related injuries among a sample of working youth in the US.

Although race and SES are known to be correlated and may combine to affect health outcomes in complex ways, the focus of this study was on SES and not race *per se*. Therefore, analyses were conducted in a manner intended to acknowledge that SES, as measured in the available data, might differentially affect the prevalence of work-related injuries among adolescents of different races.

METHODS

Approach:

A cross-sectional analysis was performed using previously collected survey data from 2,277 working teens in five metropolitan high schools across the US.

Variables:

Work-related Injury – Subjects were asked whether they had ever sustained any of the following injuries while working for pay for someone outside their household: muscle injury, burn, cut, broken bone, electric shock, or any other injury. A dichotomous measure of ever having had one or more of these injuries while at work (regardless of severity), versus having none, was created and used in our analysis.

Socioeconomic Status – The primary measure of SES was subjects' mother's highest level of education achieved. Original responses were categorized into either, 1) less than high school diploma, 2) high school diploma or GED/technical school/some college, 3) college degree, and 4) post graduate education. A secondary SES measure was a dichotomous variable which indicated that financially supporting one's family was a motivation for working.

Race/Ethnicity – Responses to self reported race and ethnicity were categorized as follows: 1) White, 2) Black/African American, 3) Asian, 4) Hispanic (any race) and 5) Other.

Work History Duration – The duration between current age and age at first employment was used as a proxy for time at risk of work-related injury.

Statistical Analysis:

- Initial analysis used T-tests to compare means and Chi-square tests were performed to test or associations between categorical variables.
- Non-parametric tests for trend across ordered groups were used to determine unadjusted associations between SES and injury prevalence. We then modeled the relationship between SES and work-related injury.
- Instead of odds ratios typically obtained in cross-sectional studies with dichotomous outcome variables, prevalence ratios were obtained in this study using a newly formulated application of proportional hazards regression models (i.e., Cox Regression).
- To accomplish this, "time to failure" for all observations was arbitrarily set to a value of one and the dichotomous variable indicating having ever been injured at work is deemed the "failure event." The Breslow method for handling tied failure observations and robust variance estimators were applied.

RESULTS

Table 1. Sample Characteristics (n=2,277)

Characteristic	Mean	SD	N
Age	16.1	1.1	1986
Work History Duration (yrs)	1.6	1.5	1766
Sex		%	N
Male	52.9		1,097
Female	47.1		960
Location of High School			
Brockton, MA	12.8		293
Los Angeles, CA	7.4		169
Oakland, CA	7.9		180
Philadelphia, PA	9.0		205
Lowell, MA	62.8		1430
Race/Ethnicity			
White	38.5		747
Black/African American	18.9		367
Asian	25.5		494
Hispanic (all races)	14.7		286
Other	2.4		47
Mother's Education			
Less than HS Diploma	8.5		273
HS Diploma/Some College	47.4		701
College Graduate	24.0		355
Postgraduate Education	10.4		150
Works to Support Family	21.9		499
Injured at Work	41.2		937

Table 2. Measures of SES for All Teens and by Race/Ethnicity

	White % (N)	Black/AA % (N)	Asian % (N)	Hispanic % (N)	Other % (N)	Total % (N)
Mother's Education*						
Less than HS Diploma	8.7 (58)	7.2 (21)	44.2 (103)	39.1 (79)	5.9 (2)	18.4 (263)
HS Diploma/Some College	47.8 (320)	61.5 (79)	34.3 (80)	39.1 (79)	55.9 (19)	47.4 (677)
College Graduate	29.9 (200)	24.1 (70)	15.5 (36)	13.9 (28)	29.4 (10)	24.1 (344)
Postgraduate Education	13.6 (91)	7.2 (21)	6.1 (14)	7.2 (16)	8.8 (3)	10.2 (145)
Works to Support Family**	7.9 (59)	25.3 (93)	31.6 (156)	37.4 (106)	23.4 (11)	21.9 (425)

*Chi-square, 12 df, p-value < 0.001
**Chi-square, 4 df, p-value < 0.001

Table 3. SES and Occupational Injury Prevalence for All Teens and by Race/Ethnicity

	Percent Reporting an Occupational Injury				
	White	Black/AA	Asian	Hispanic	All Teens
Mother's Education					
Less than HS Diploma	63.8	42.9	41.7	39.2	46.0
HS Diploma/Some College	53.1	44.1	45.0	36.7	47.7
College Degree	47.0	40.0	44.4	39.3	44.5
Postgraduate Education	35.2	42.9	42.9	50.0	37.9
P-value for trend*	<0.001	0.73	0.78	0.59	0.17
N	669	291	233	202	1429
Works to Support Family					
Yes	66.1	47.3	48.7	50.9	51.1
No	47.4	39.4	34.3	35.0	41.5
Chi-square p-value**	<0.01	0.18	<0.01	<0.01	<0.001
N	747	367	379	286	1941

*Non-parametric test for trend of injury frequency across mother's education level within each demographic category.
**Chi-square test for association between frequency of injury and supporting family within demographic category.

Table 4. Effect of SES on Occupational Injury Prevalence among All Teens

Mother's Education	Prevalence Ratios and 95% CI			
	Model 1 ^a	2 ^b	3 ^c	4 ^d
Less than HS Diploma (referent)	1.0	1.0	1.0	1.0
HS Diploma/Some College	1.06	1.07	1.03	1.01
College Graduate	0.99	0.97	0.91	0.89
Postgraduate Education	0.86	0.85	0.78	0.76
P-value*	0.26	0.15	0.06	0.03
N	1479	1299	1253	1253
Works to Support Family	1.29	1.14	1.20	1.19
CI	(1.05, 1.59)	(1.00, 1.30)	(1.06, 1.35)	(1.06, 1.34)
N	2277	1766	1655	1655

a – Unadjusted
b – Adjusted for work history duration
c – Adjusted for work history duration, age, gender and race
d – Adjusted for work history duration, age, gender, race and location of high school
*Wald Test, 3 d.o.f.

Table 5. Effect of SES on Occupational Injury Prevalence, Stratified by Race/Ethnicity

Mother's Education	Prevalence Ratios and 95% CI			
	White	Black/AA	Asian	Hispanic
Less than HS Diploma (referent)	1.0	1.0	1.0	1.0
HS Diploma/Some College	0.87	1.34	1.05	1.00
College Degree	0.78	1.05	0.99	0.93
Postgraduate Education	0.59	1.47	0.63	1.06
P-value*	0.01	0.42	0.71	0.98
N	586	271	191	180
Works to Support Family	1.21	1.25	1.06	1.40
CI	(0.99, 1.48)	(0.96, 1.63)	(0.86, 1.31)	(1.05, 1.87)
N	647	337	386	250

All models adjusted for work history duration, age gender and location of high school.
*Wald Test, 3 d.o.f.

CONCLUSIONS

- SES, measured as mother's education level, was associated with a drop in injury prevalence for teen workers
- Second measure of SES, working to provide financial support for one's family, was positively associated with injury prevalence among teen workers
- The working to support one's family variable was less often missing than mother's education and may be a valuable indicator of SES in survey research
- The effects of SES measures varied by race:
 - Mother's education was strongly associated with injury prevalence only among white teen workers
 - The association between working to support one's family and injury prevalence was strongest among Hispanic teens, followed by black and white teens and was not associated with risk among Asian teen workers.
- The choice of SES measure must take into account the possible mechanisms by which associations might work in the real world and how these may vary by race

Acknowledgement

This research was supported by grant #5R03OH009557 from the CDC/ National Institute for Occupational Safety and Health. Contents are solely the responsibility of the authors and do not represent official views of the CDC/NIOSH.