HHS Public Access

Author manuscript

Am J Ind Med. Author manuscript; available in PMC 2016 August 05.

Published in final edited form as:

Am J Ind Med. 2015 July ; 58(7): 737–745. doi:10.1002/ajim.22460.

Cohort study of physical activity and injury among Latino farm workers

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Abstract

Introduction—This study characterized physical activity and its association with injury among Latino farm workers.

Methods—An interviewer-administered questionnaire was used to collect baseline and follow-up data on 843 and 640 Latino farm workers, respectively. Participants were 18–55 years old, engaged in farm work and residing in Mendota, CA at baseline interview. The questionnaire assessed self-reported physical activity and risk of injury.

Results—The 12 month prevalence of injury decreased from 9.0% at baseline to 6.9% at follow up interview. In GEE models adjusted for age, follow-up time, gender, smoking, income and years working in agriculture, poor/fair self-assessed health status (OR=1.82, 95% CI: 1.18, 2.82) and 2–3 hours per day of sitting/watching TV/using a computer (OR=0.50, 95% CI: 0.30–0.83) were significantly associated with injury.

Conclusions—Physical activity was not associated with injury in this population. Efforts to reduce injuries should focus on known risk factors such as poor health status.

Background

Physical activity rates have declined in the U.S. [Brownson, et al. 2005] as society has been shifting from an industrial to a service-based economy during the past decades. This shift has largely been attributed to increasing use of computers, reliance on automobiles, and sedentary leisure activities such as television (TV) viewing [Brownson, et al. 2005; Ratzlaff, et al. 2007; Wu and Porell 2000]. U.S. adults usually spend almost 5 hours/day watching TV [Otten, et al. 2010]. Previous studies found that those who are younger, male and with higher education or socioeconomic status (SES) reported a higher prevalence of physical activity [King, et al. 2001]. Additionally, the prevalence of physical activity was lower among Hispanic individuals than non- Hispanic Whites [Neighbors, et al. 2008].

Regular physical activity has important health benefits and is associated with decreased risk of coronary heart disease, cancer, diabetes mellitus and hypertension [Carlson, et al. 2006;

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Statement: There are no conflicts of interest.

Ratzlaff, et al. 2007; Service 2008]. Physical activity can also increase muscular strength, improve soft tissue extensibility and blood flow, and maintain normal joint range of motion, thus providing better balance, movement control and reducing risk of injury [Buckwalter and Lane 1997; James, et al. 1994; Ratzlaff, et al. 2007]. Studies have indicated that moderate levels of physical activity may provide protection against injury [Gilchrist, et al. 2000]. In studies of exercise-related injury among civilian women, Gilchrist et al. reported that higher levels of aerobic fitness protected against future injury [Gilchrist, et al. 2000]. A national survey in Canada reported that an active lifestyle outside of work was associated with lower prevalence of work-related upper-body repetitive strain injuries [Ratzlaff, et al. 2007]. However, some studies have reported that vigorous activity (running, recreational and competitive sports) is associated with increased risk of injury [Conn, et al. 2003; Macera 1992; Parkkari, et al. 2004; van Mechelen 1992].

Engagement in agricultural employment has declined from 12.2% of the working population in 1950 to less than 2% in 2000 based on U.S. census data [Brownson, et al. 2005]. However, these figures underestimate the extent of employment in the agricultural industry as they exclude migrant workers who were not U.S. citizens. Additionally, the majority of California farm labor comprises immigrants, predominantly from Mexico or Central/South America [Schenker 2010]. Despite the significance of Latinos in California farm labor, no studies have examined the association between physical activity and injury risk among this vulnerable population.

Physical activity occurs in a variety of settings, including occupational, leisure, household and yard work, human-powered transport (e.g., walking/biking/swimming by using human muscle power) [Craig, et al. 2003]. In this analysis, occupational activity, moderate levels of physical activity (including leisure time, household and yard work activity) and sedentary activity (sitting/TV watching/computer use) were examined in a cohort of California farm workers. The purpose of this study is to characterize physical activity and its association with injury among Latino farm workers; specifically, whether moderate/leisure activity is associated with a decreased risk of injury.

Methods

Sample description and eligibility

MICASA is a population-based cohort study of occupational and environmental exposures affecting the health of hired farm workers in California. Study participants included both men and women, 18–55 years old, who identified themselves as Mexican, Central American, Hispanic or Latino, residing in Mendota, CA at the time of the baseline interview, with at least one household member engaged in farm work 45 days or more in the year prior to recruitment. Detailed demographic and occupational characteristics of the baseline population have been described elsewhere [Xiao, et al. 2013].

Sampling and recruitment

A two-stage sampling procedure was used with census block as the primary sampling unit and a door-to-door enumeration of residents in all dwellings within randomly selected

blocks. Details of the procedure are documented elsewhere[Stoecklin-Marois, et al. 2011]. The final sample recruited included 467 households, comprising 843 adults who completed a baseline interview between January 2006 and April 2007. The baseline response rate was 843 (81%) of 1039 subjects selected for inclusion in the MICASA study. Follow-up interviews were completed with 640 adults between November 2008 and February 2010. For this analysis, the sample was restricted to 759 adults who completed baseline interview and reported ever worked in agriculture, plus 620 adults who completed follow-up interviews and reported having ever worked in agriculture in his/her life or worked in agriculture during past 12 months before interviews.

Data collection

All data collection was performed by trained interviewers in Mendota, California. At both baseline and follow-up interviews, participants provided information on demographics, smoking status and acculturation, occupational and environmental risk factors, physical activity as well as a variety of health outcomes, including injury. However, detailed information about specific activities at the time of injury was limited to follow-up interview. Written consent was obtained from each participant, and trained staff conducted interviews in Spanish. Participants received a $15 gift certificate for completing interviews. All study procedures were approved by the University of California, Davis Institutional Review Board, and protocol number 224644.

Outcome measurement

The primary outcome measure was defined as self-report of an injury in the 12 months prior to both baseline and follow-up interviews. An injury was defined as an event characterized as causing bodily damage requiring medical care or resulting in loss of consciousness or loss of at least one-half day of work time or restricting normal activity. Descriptive information about the type of injury, diagnosis, object causing the injury, and the part of the body affected were also ascertained. Agricultural work injuries were those that occurred during work activities. Except where noted, analysis included all reported injuries (both work-related and non-work related) combined.

Exposure measurement

The primary exposure measure was self-reported assessment of physical activity measured at baseline and follow-up interview based upon the NHANES III instrument [NHANES 1997]. Items assessed walking or biking to and from work, engaging in moderate physical activity, usual daily activity, and time spent in sedentary activity, such as sitting/watching TV or using a computer. These items asked about usual activity over the past 30 days. A final question assessed how physical activity within the past 30 days compared to activity over the past 12 months.

Moderate physical activity was defined as tasks in or around the home or yard for at least 10 minutes causing light sweating or a slight to moderate increase in heart rate or breathing (such as raking leaves, mowing the lawn or heavy cleaning). Minutes per week engaging in moderate activity and walking/biking were calculated based upon reporting of frequency (times per week) and duration (minutes) of these activities. Individuals who did not report

moderate activity or biking/walking were coded as “0” minutes/week in analysis. Minutes per week walking/biking to and from work/school and engaging in moderate physical activity were included as continuous variables in the generalized estimating equations (GEE) models. At baseline and follow-up, two participants were excluded from analysis respectively due to extreme values, suggesting inaccurate reporting of hours of physical activity per week.

Participants assessed their daily activity level by choosing one of four ordinal categories: 1= sit during day and do not walk about very much; 2=stand/walk during the day, but don’t have to carry or lift things often; 3=lift or carry light loads, or have to climb stairs or hills often; 4=heavy work or carry loads. This information was entered into the regression model as a continuous variable, with integer values ranging from 1 to 4 reflecting the participant’s chosen category.

“Sitting or watching TV or using a computer” was assessed by asking participants on a typical day, how much time in total in the past 30 days was spent sitting or watching TV or videos or using a computer outside of work. Ordinal categories responses were less than one hour, 2–3 hours, and four hours or more.

Confounding factors

Age, gender, smoking status, years working in agriculture, education level, self-assessed health status, and family income from both baseline and follow-up interviews were considered as potential confounding factors based on literature review and bivariate assessment. Age, years working in agriculture and follow-up time were included as continuous variables in multivariate models. Gender, smoking status (current, never, ex-smoker), education level (no schooling, primary or less, >primary) and self-assessed health status (poor/fair vs. good/very good/excellent) and family income (<=10,000, > 10,000, >20,000, > 30,000) were included as categorical variables in the model.

Statistical analysis

Initial descriptive statistical analyses were conducted for the outcome and exposure measures and important covariates (age, gender, smoking, income, education level, self-assessed health status and years working in agriculture). Chi-square tests were used to compare categorical variables. A generalized estimating equations (GEE)[Liang and Zeger 1986] approach was used to analyze longitudinal data of the binary outcome (injury) to account for correlation between the repeated observations within the same participant. Repeated measurements of injury were modeled as a function of age at baseline, gender, smoking status, marital status, family income, education level, self-assessed health status, years working in agriculture, physical activity and the repeated measures of follow-up time (aging). We also conducted analyses to compare subjects who had dropped out versus those who had stayed in the study for the follow-up interview. The final model included all activity variables simultaneously. All analyses were conducted using SAS 9.1.3 (Cary, NC, USA).

Results

Demographic characteristics at follow-up interview

A total of 620 participants, 292 men (47.1%) and 328 women (52.9%) completed both the baseline and follow-up interview. The average length of time was 2.7 years (SD=1.3) between baseline and follow-up interview (Table 1). Nearly 95% of participants were married or living with someone, similar to reported marital status at the baseline interview (94%). 8.4% of participants were current smokers at follow-up interview, which is lower than the 11% reported at baseline interview. Forty-six percent rated their health as poor or fair at follow-up interview. Education and family incomes were low in the population, with 65% reporting primary education or less and 42% earning less than $20,000/year at follow-up interview (Table 1).

Characteristics of injury at follow-up interview

The twelve-month cumulative incidence of injury from all causes was 9.0% (68 injuries) at baseline interview and 6.9% (43 injuries) at follow-up. The 12-month cumulative incidence of injury at follow-up for men was nearly three times higher than that for women, and current smokers reported more injuries than non-smokers or ex-smokers (Table 1), consistent with the baseline interview result (17.7% injured among smokers vs. 12% injured among ex-smokers or non-smokers at baseline interview). Among 43 injuries reported at follow-up, being struck by an object (21%), falling (21%), and motor vehicle accidents (21%) ranked as the top three causes (Figure 1). Twenty-eight (65%) follow-up injuries occurred during agricultural work, most frequently while working in tomatoes (21.4%), melon (10.7%) or almond (10.7%) (Table 2). The primary tasks that participants reported at the time of the injury were irrigating (14.3%), driving (14.3%) or packing (10.7%) (Table 2).

Comparisons between lost to follow-up and cohort participants

Among those who reported ever working in agriculture at baseline, 203 subjects were to lost to follow-up. Participants lost to follow-up were more likely to be men, current smokers, younger than 30 years old, with higher education level, better self-assessed health status and lower annual income, earning < $20,000 per year (p values <0.01). Additionally, participants lost to follow-up differed from those remaining in the cohort on several baseline physical activity measures. Lost to follow-up participants were less likely to walk or bike to and from work/school and engaged in fewer moderate physical activities. They reported higher prevalence of activity involving lifting or carrying light loads; climbing stairs or hills often; and spent more time watching TV (p-values <0.01). There were no differences among lost to follow-up and participants remaining in the cohort on the prevalence of injury with 10% (n=20) and 6.9% (n=43) reported injury, respectively.

Characteristics of physical activity at baseline and follow up interview

More than 70% of participants reported daily activities consisting primarily of standing or walking around without carrying or lifting, and more than 50% of participants reported sitting/watching TV/using a computer about 2–3 hours per day (Table 3) at both baseline and follow-up interview. The proportion of participants walking/biking to work and the amount

of moderate physical activity greatly increased at follow-up interview compared to baseline (Table 3).

Physical activities and injury

A GEE approach was used to assess associations between physical activity and injury. After adjusting for age, follow-up time, gender, smoking, income, marital status, self-assessed health status, and years working in agriculture, there was a significant interaction between gender and smoking ($p = 0.036$), with a significantly greater risk of injury among female current smokers compared to female non-smokers (OR=6.12, 95% CI: 2.05–18.31), male non-smokers compared to female non-smokers (OR=1.94, 95% CI: 1.08–3.50), and male ex-smokers compared to female non-smokers (OR=2.45, 95% CI: 1.16–5.16). Participants who reported having fair or poor health status were more likely to experience an injury compared with those who reported having good or excellent health status (OR=1.82, 95% CI: 1.18–2.82).

Physical activity was not associated with injury, and these results were consistent for usual daily activity, walking/biking to school or work, and engaging in moderate levels of physical activity. Participants who reported 2–3 hours per day of sitting/watching TV/using a computer were less likely to experience an injury compared with those who reported low levels of sitting/watching TV/computer (OR=0.50, 95% CI: 0.30–0.83) (Table 4).

Discussion

The goal of this analysis was to characterize physical activity among Latino farm workers and assess whether physical activity is associated with injury in this population. Our results suggest that there was significant protective effect of TV watching with injury, while female current smoking and poor or fair self-assessed health status were associated with an increased risk of experiencing an injury. Measures of physical activity, including walking/biking to work, moderate physical activity and usual daily activity showed no association with injury.

There is little information regarding the association between TV watching and injury. Shipp, et al. reported that non-fatal occupational injury was associated with not watching TV among adolescent farmworkers in South Texas. The reason behind this finding is unclear; however, the authors suggested that not watching TV may be an indication of lower socioeconomic status [Shipp, et al. 2013].

A consistent association of smoking with the risk of injury has been found in previous studies. Smoking was independently associated with the risk of hip fracture in a 30-year follow-up study of hip fracture in Gothenburg, Sweden (Trimpou, Landin-Wilhelmsen et al. 2010). Ratzlaff et al. reported that smoking was associated with work-related repetitive strain injury in the Canadian Community Health Survey [Ratzlaff, et al. 2007]. Smoking was also associated with neck/shoulder/upper extremity problems among self-employed Dutch farmers [Hartman, et al. 2006]. One possible mechanism suggested for the strong association was nicotine withdrawal symptoms, such as irritation and listlessness, which were reported as present most of the time among smokers when not smoking [Watkins, et al. 2000].

Withdrawal symptoms may degrade smokers' mood and cognitive performance [Sommese and Patterson 1995], thereby increasing the risk for injury. Another possible mechanism of increased injury risk might be distractions or blurred vision from smoke or smoking-associated activities [NIOSH 1979; Wen, et al. 2005].

In our study, participants who reported having fair or poor health status were more likely to experience an injury at work compared to those who reported excellent or good health. Consistent with our results, studies of farmers have found that injury was associated with having a health problem that limits work and that doctor-diagnosed arthritis/rheumatism, difficulty hearing normal conversation, and taking medication regularly were significantly associated with the risk of fall-related farm injury [Lewis, et al. 1998; Sprince, et al. 2003]. Similarly, farmers with a prior history of injury were at increased risk of injury for a farm-related injury among Kentucky farmers [Browning, et al. 1998]. Voaklander et al. reported that previous injury, hearing problem, depression, arthritis, sleep deprivation, and the use of "any medication" were significant contributing factors to the risk of agricultural injury [Voaklander, et al. 2009]. Self-assessed health status is quite a different measurement than diagnosed conditions. The evidence regarding the validity of self-assessed work related illness of a health condition is scarce. Lenderink and Zoer reported that worker's self-reported illness have valuable information on presence of musculoskeletal and skin diseases [Lenderink, et al. 2012].

We observed a decline in the prevalence of injury from 9.0% at baseline to 6.9% at follow up interview. It is not known what intervening factors may have occurred between baseline and follow-up interviews, but it is possible that individuals with prior injury may purposely avoid physical activity or have reduced levels of employment, thus decreasing the risk of injury due to reduced exposure. A "healthy worker effect" [Chevrier, et al. 2014]may play a role. Participants reporting injury at baseline interview may have been less likely to be available to complete the follow-up survey than uninjured persons, leaving a pool of relatively healthier participants with lower injury risk at follow-up interview. Another possibility is that the amount of time working may be lower among those with poor health, thus reducing their overall exposure and injury risk. Similarly, the apparent protective effect associated with sitting/watching TV/using a computer may also be due to reduced exposure time in hazardous work environments.

Walking/biking to work, moderate physical activity and usual daily activity showed no association with injury in this analysis. This finding was unexpected since previous studies in other populations have found a protective association between level of physical activity and injury risk. Protection has been attributed to physical activity's role in enhancing physical fitness and alleviating depression, stress and anxiety [Brumby, et al. 2011; Dunn, et al. 2005]. Gilchrist et al. found that higher levels of current physical fitness protected participants against future exercise-related injury in women [Gilchrist, et al. 2000]. The lack of observed protection from physical activity in our study may be due to measurement error associated with self-report, or perhaps levels of physical activity were too low to produce a protective effect. It may be that leisure time physical activity levels were low, but everyday activities at work may result in a higher level of physical fitness. This could wash out any

effect of leisure time physical activity. It is also difficult to compare findings from our study with other studies because the populations have different activity levels.

There were several limitations in the study. First, study data were based on self-report, which is subject to recall bias. There is no “gold standard” for assessing physical activity in field settings; thus, using a questionnaire to measure physical activity is subject to measurement error. Second, this is the first study to examine physical activity and injury risk in farm workers, and few comparison data are available. Third, missing values due to attrition might affect the validity and precision of study results. Fourth, the GEE methods has some limitations in the efficacy of estimators, goodness-of-fit tests and model selection criteria. Fifth, we couldn’t assess potential clustering of outcomes within households as we did not have related information for analysis. Finally, injured workers are more likely to leave their job positions, potentially leading to a “healthy worker effect” in which remaining workers tend to be healthier than those who left, thus obscuring underlying associations between risk factors and injury [Hartvigsen, et al. 2001].

There were also several strengths of this study. The prospective design allowed us to show a temporal sequence supporting causality between exposure and outcome, thereby observing a significant relationship between smoking and poor/fair self-assessed health status as risk factors for injury among Latino farm workers. The relatively large sample size and high response rate also increased the precision and validity of estimates of the study. Although the assessment relied on self-report, we have used standardized questions on physical activity taken from NHANES instruments. Interviews were conducted in Spanish by trained interviewers to minimize interview biases. Finally, strict data quality control and management was performed to minimize information bias and ensure the validity and precision of the study.

Overall we feel that the strengths of the study outweigh the limitations, and the conclusions represent true biologic findings in this population of immigrant farmworkers. Efforts to reduce injury among farmworkers should include attention to identified risk factors.

Conclusion

We found no association between physical activity and injury among Latino farm workers. Several factors may account for this finding, including the nature of the study population and observed levels of physical activity. It is important to understand characteristics and levels of physical activity in different occupational groups such that prevention recommendations can be tailored to these specific populations. Observed association of cigarette smoking and poor/fair self-reported health may be useful for efforts to reduce workplace injury among hired farmworkers. Self-assessed health status should be a potential area for further study.

Acknowledgments

For non-blinded acknowledgment: The authors appreciate the advice and support from Dr. Robert Harrison at the University of California, San Francisco; Tamara Hennessy-Burt for data management support; and the MICASA field team—Gloria Andrade, Ana Cervantes, Alex Cervantes and Giselle Garcia.

This study was funded by National Institute for Occupational Safety and Health (Research agreements: 2U50OH007550 and 1R01OH009293). The authors appreciate the advice and support from Dr. Robert Harrison at the University of California, San Francisco; Tamara Hennessy-Burt for data management support; and the MICASA field team—Gloria Andrade, Ana Cervantes, Alex Cervantes and Giselle Garcia. Additional support was provided by the National Center for Advancing Translational Sciences, National Institutes of Health, through grant #UL1 TR000002.

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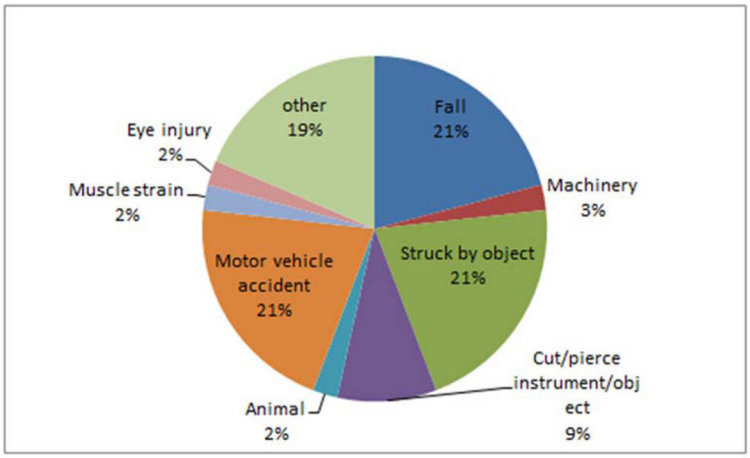

Figure 1.
Types of injury reported by MICASA Study participants at follow up interview (2008–2010), n=43.

Table 1

Demographic characteristics of MICASA Study farm worker participants by injury status assessed at follow-up interview (2008–2010).

	Overall (n=620) n (column %)	Non-injury (n=577) n (%)	Injury (n=43) n (row %)	P-value * chi-square test
Age at follow-up				0.2
0 <30	115 (18.6)	106 (92.2)	9 (7.8)	
31–40	196 (31.6)	178 (90.8)	18 (9.2)	
41–50	196 (31.6)	183 (93.4)	13 (6.6)	
50+	113 (18.2)	110 (97.4)	3 (2.7)	
Gender				0.002
Male	292 (47.1)	262 (89.7)	30 (10.3)	
Female	328 (52.9)	315 (96.0)	13 (4.0)	
Marital status				0.7
Married/live with someone	586 (94.5)	546 (93.2)	40 (6.8)	
Live alone	34 (5.5)	31 (90.9)	3 (8.8)	
Smoker				0.04
Never smoked	482 (77.7)	452 (93.8)	30 (6.0)	
Ex-smoker	86 (13.9)	81 (94.2)	5 (5.8)	
Current smoker	52 (8.4)	44 (84.6)	8 (15.4)	
Family income				0.2
$0–10,000	67 (10.8)	63 (94.0)	4 (6.0)	
>$10,000	198 (31.9)	190 (96.0)	8 (4.0)	
>$20,000	176 (28.4)	161 (91.5)	15 (8.5)	
>$30,000	179 (28.9)	163 (91.1)	16 (8.9)	
Education level				0.8
No school	34 (5.5)	33 (97.1)	1 (2.9)	
Primary education or less	372 (60.2)	350 (94.1)	22 (5.9)	
>Primary education	212 (34.3)	192 (90.6)	20 (8.8)	
Self-assessed health status				0.8
Excellent/Very good/Good	335 (54.1)	311 (92.8)	24 (7.2)	
Fair/Poor	284 (45.9)	265 (93.3)	19 (6.7)	

* p-value for differences between injury and non-injury for demographic variables assessed at follow-up interview.

Table 2

Agricultural work-related injuries reported by MICASA Study participants at follow-up interview (2008–2010).

Injury occurred while doing agricultural work			N	%
Yes	Task or job	Driving	4	14.3
		Irrigation	4	14.3
		Packing	3	10.7
		Pruning	3	10.7
		Loading	2	7.1
		Cutting iron	2	7.1
		Picking	1	3.6
		Cleaning	1	3.6
		Cargo handling	1	3.6
		Weighing	1	3.6
		Planting	1	3.6
		Welding	1	3.6
		Weeding	1	3.6
		Other	3	10.7
		Total	28	100.0
	Crop or commodity	Tomato	6	21.4
		Melon	3	10.7
		Almond	3	10.7
		Broccoli	2	7.1
		Cotton	2	7.1
		Lettuce	2	7.1
		Pistachio	2	7.1
		Grapes	2	7.1
		CattleNuts	1	3.6
		Corn	1	3.6
		Wheat	1	3.6
		Other	1	3.6
			2	7.1
		Total	28	100.0
No			15	
Total			43	

Table 3

Characteristics of physical activity at baseline (2006–2007) and follow-up (2008–2010) interview.

	Baseline (n=757)	Follow up (n=618)	% Change
Walk/bicycle to and from work/school n (%)			
Yes	277 (36.7)	355 (57.4)	+20.7
hours per week (quartile Q1, Q2, Q3)	0, 0, 2.0	0, 0.75, 3.0	
Moderate physical activity n (%)			
Yes	250 (33.3)	495 (80.1)	+46.8
hours per week (quartile Q1, Q2, Q3)	0, 0, 1.0	0.5, 1.5, 4.0	
Usual daily activities n (%)			
Sit and do not walk about very much	69 (9.2)	55 (8.9)	−0.3
Stand or walk about quite a lot, but do not have to carry or lift things very often	541 (72.4)	459 (74.3)	+1.9
Lift or carry light loads, or have to climb stairs or hills often	100 (13.4)	70 (11.3)	−2.1
Do heavy work or carry heavy loads	37 (5.0)	34 (5.5)	+0.5
Sit/watch TV or using a computer n (%)			
Low (<=1 hour/day)	147 (19.5)	194 (31.4)	+11.9
Medium (2–3 hours/day)	484 (64.3)	336 (54.4)	−9.9
High (>= 4 hours/day)	122 (16.2)	88 (14.2)	−2.0
Physical activities within past 30 days vs. past 12 months n (%)			
More active	141 (18.8)	92 (15.1)	−3.7
Less active	132 (17.6)	194 (31.8)	+14.2
About the same activity	478 (63.7)	325 (53.2)	−10.5

Table 4

Longitudinal analysis of risk of injury between baseline (2006–2007) and follow-up interview (2008–2010) as a function of baseline age, time, sex, smoking status, years working in agriculture, income, education level and physical activity.

	Beta	SE	0R [95% CI]
Baseline age (1year) *	−0.02	0.02	0.98 [0.95, 1.01]
Follow-up time (1 year) *	−0.09	0.06	0.92 [0.81, 1.04]
Years working in agriculture (1 year) *	0.03	0.02	1.03 [0.99, 1.06]
Marital status			
Married/live with someone			1.0
Non-married/live with someone	−0.04	0.52	0.96 [0.34, 2.68]
Sex, Smoking status			
Female, Never smoked			1.0
Female, Ex-smoker	−0.37	1.00	0.69 [0.10, 4.90]
Female, Current smoker	1.81	0.56	**6.12 [2.05, 18.31]**
Male, Never smoked	0.66	0.30	**1.94 [1.08, 3.50]**
Male, Ex-smoker	0.90	0.38	**2.45 [1.16, 5.16]**
Male, Current smoker	0.83	0.44	2.28 [0.96, 5.44]
Family income			
$0–10,000	0.33	0.37	1.39 [0.67, 2.88]
>$10,000	−0.18	0.31	0.84 [0.46, 1.52]
>$20,000	−0.08	0.34	0.92 [0.47, 1.80]
>$30,000			1.0
Education level			
No school	−0.14	0.51	0.87 [0.32, 2.38]
Primary education or less	−0.17	0.26	0.84 [0.51, 1.41]
>Primary education			1.0
Self-assessed health status			
Excellent/Very good/Good			1.0
Fair/Poor	0.60	0.22	**1.82 [1.18, 2.82]**
Walk/bicycle to and from work/school (hrs/wk)	0.003	0.02	1.003 [0.96, 1.05]
Moderate physical activity (hrs/wk)	0.01	0.02	1.01 [0.98, 1.05]
Usual daily activities			
Sit and do not walk about very much			1.0
Stand or walk about quite a lot, but do not have to carry or lift things very often	0.02	0.39	1.02 [0.47, 2.19]
Lift or carry light loads, or have to climb stairs or hills often	−0.51	0.51	0.60 [0.22, 1.64]
Do heavy work or carry heavy loads	−0.23	0.63	0.79 [0.23, 2.72]
Sit/watch TV or use a computer			
Low (<=1 hour/day)			1.0
Medium (2–3 hours/day)	−0.69	0.26	**0.50 [0.30, 0.83]**
High (>=4 hours/day)	−0.36	0.37	0.70 [0.34, 1.42]

* Odds ratios for age, follow-up time, and years working in agriculture are based upon one-year time increments.