

2011

Exercise Habits and Tobacco Use among Male Latino Farmworkers

Jason Brumitt

George Fox University, jbrumitt@georgefox.edu

Leda I. Garside

Rebecca Reisch

Talina Marshall

Hui En Gilpin

See next page for additional authors

Follow this and additional works at: http://digitalcommons.georgefox.edu/pt_fac



Part of the [Physical Therapy Commons](#)

Recommended Citation

Published in *Journal of Agromedicine*, 2013; 18(2): 122-131 <http://www.tandfonline.com/loi/wagr20>

This Article is brought to you for free and open access by the School of Physical Therapy at Digital Commons @ George Fox University. It has been accepted for inclusion in Faculty Publications - School of Physical Therapy by an authorized administrator of Digital Commons @ George Fox University. For more information, please contact arolfe@georgefox.edu.

Authors

Jason Brumitt, Leda I. Garside, Rebecca Reisch, Talina Marshall, Hui En Gilpin, Jessica Kinsey, Kelsey Imondi, and Heather Robinson

Exercise Habits and Tobacco Use Among Male Latino Farmworkers

Jason Brumitt, PT, PhD, SCS, ATC
Leda I. Garside, RN, BSN, MBA
Rebecca Reisch, PT, DPT, OSC
Talina Marshall, PT, DPT, LMT
Hui En Gilpin, PT, DPT, CSCS
Jessica Kinsey, PT, DPT
Kelsey Imondi, PT, DPT
Heather Robinson, SPT, LMT

ABSTRACT. Migrant farmworkers risk occupational injury and are at risk for developing chronic health conditions. Exercise may enhance health and help to reduce the risk of occupational injury and/or reduce the risk of developing a chronic health condition. Little is known, however, about the exercise habits of Latino migrant farmworkers. Male Latino migrant farmworkers completed an exercise and health habits questionnaire at health screening clinics. One hundred fifty-three (58.2%) subjects reported exercising during the week. There was no difference in age between those who reported exercising and those who did not ($p = .78$). Only 42 (16%) of all workers reported exercising for 3 or more hours a week. Seventeen percent of the subjects reported smoking and almost 10% reported chewing tobacco. A majority of subjects do not meet the Centers for Disease Control and Prevention (CDC) exercise guidelines. Tobacco use is highest among individuals who do not exercise. These findings suggest the need for health education interventions for this population. Additional studies are warranted to understand exercise and health habits of this population.

KEYWORDS. Agricultural workers, exercise, Latino, migrant worker, minority health, tobacco use

INTRODUCTION

Millions of seasonal and migrant farmworkers from Mexico and other Central

American countries are employed in the United States to plant and harvest crops each year.¹⁻⁶ Agricultural work is physically demanding and is amongst the most dangerous occupations in

Jason Brumitt and Rebecca Reisch are affiliated with the School of Physical Therapy, Pacific University, Hillsboro, Oregon, USA.

Leda I. Garside is affiliated with Tuality Healthcare, Hillsboro, Oregon, USA.

Talina Marshall is affiliated with Innovative Senior Care, McMinnville, Oregon, USA.

Hui En Gilpin is affiliated with Impact Physical Therapy 4950 NE Belknap Court, Suite 107 Hillsboro, Oregon.

Jessica Kinsey is affiliated with Beyond the Clinic, Portland, Oregon, USA.

Kelsey Imondi is affiliated with Innovative Services, Vancouver, Washington, USA.

Heather Robinson is affiliated with the School of Physical Therapy, Pacific University, Hillsboro, Oregon, USA.

Address correspondence to: Jason Brumitt, PT, PhD, SCS, ATC, School of Physical Therapy, Pacific University, 222 SE 8th Avenue, Hillsboro, OR 97123, USA (E-mail: brum4084@pacificu.edu).

the United States.⁷⁻¹¹ Migrant and seasonal farmworkers are at risk for heat illness, exposure to chemicals and pesticides, occupation-related skin diseases, musculoskeletal injury, respiratory illness, traumatic injury, and death.^{1,9-16}

The physical demands associated with work on a farm or at a vineyard require long hours (a minimum of 8 hours a day; up to all daylight hours during harvest) of performing repetitive tasks, shoveling, lifting, and tractor and equipment use.^{17,18} General tasks such as lifting heavy objects or “difficult working positions” have been associated with farmers reporting musculoskeletal symptoms.¹⁸ Table 1 presents some of the general occupational requirements and reported injury risk factors associated with vineyard work.¹⁷ In particular, harvesting (Figure 1), pruning, planting, and shoveling have been identified by vineyard workers as the occupational tasks that are fatiguing and/or cause injury.¹⁷

FIGURE 1. A worker harvesting grapes (color figure available online).



There is evidence in the literature of musculoskeletal injuries in seasonal and migrant vineyard workers. Meyers et al. reported 29 musculoskeletal disorders (MSDs) in a population of 194 vineyard workers over a 2½-year

TABLE 1. Seasonal Occupational Tasks, Primary Body Regions at Risk for Injury, and Associated Injury Risk Factors

Season	General job tasks	Primary body regions at risk for injury and injury risk factors ¹⁷
Winter	Pruning	Back Repetitive abnormal posturing, trunk rotation Shoulder Repetitive overuse Hand Repetitive gripping of shears
Spring	Removing leaves, cleaning debris, planting	Back Repetitive bending and twisting Shoulder Repetitive swinging motions Hand Gripping shovel
Summer	Pulling pruned vines, clearing debris, fence repair	Back Repetitive bending and twisting Shoulder Repetitive swinging motions Hand Gripping shovel
Fall	Harvest	Back Lifting/carrying, stooping, trunk rotation Shoulder Overhead lifting/carrying/dumping Hands Reaching/cutting/gripping Lower extremities Running, prolonged walking

period.¹⁷ Over 400 workdays were lost due to the MSDs in this population.¹⁷ A majority of all MSDs occurred in the back (69%), with the remaining MSDs experienced equally amongst the neck/shoulder, hand/arm, and the lower extremities.¹⁷ Brumitt et al. reported similar findings in a population of Latino migrant/seasonal vineyard workers.¹⁹ Forty-five percent of all males and 75% of all females described experiencing musculoskeletal symptoms (MSS) in one or more regions of their body.¹⁹ The workers reported the back as the primary region where they experienced MSS.¹⁹

In addition to occupational injuries, some Latino farmworkers are at risk for chronic health conditions. Diabetes, hypertension, cardiovascular disease, and cancer have been reported in the Latino immigrant population.^{20–24} Chronic health conditions, such as the aforementioned, require expensive and time-intensive medical treatment to reduce morbidity and mortality.

Addressing occupational and chronic health conditions in the immigrant population pose challenges for health care providers.^{25–29} Socioeconomic factors, specifically the structure of the payment system for health care services in the United States, affect one's access to health care services. A majority of farmworkers are not provided health insurance as a benefit of employment and the out-of-pocket costs associated with treatment may be prohibitive.⁹ Latinos, compared with other segments of the US population, are more likely to be uninsured or be underserved.³⁰ When compared with other races and/or ethnic groups in the United States, Latinos (all Latinos, not just those employed in agricultural positions) have the highest uninsured rate, with 32% of all Latinos lacking health insurance.^{6,31} Those particularly vulnerable to lacking access to health care services are undocumented immigrants.^{11,30,32} The US Census reports nearly half (46%) of all noncitizen immigrants do not possess health insurance.³¹ In addition to problems related to paying for health care, Latinos who attempt to seek medical care may encounter a lack of available services (e.g., rural settings, lack of interpreter services) and/or may have difficulty negotiating the American

health care system due to an inability to fluently speak English.

Health care providers are challenged to provide service and treatment in nontraditional settings to address the needs of those who are underserved or uninsured. Prevention may be the key to reducing risk of disease and injury in an underserved population. Exercise, as a preventative treatment, can enhance health and help to reduce the risk of occupational injury and/or reduce the risk of developing a chronic health condition. However, adherence to exercise is poor in the United States. In general, exercise habits in the United States are suboptimal, as evident by over 60% of the population classified as “overweight” or “obese.”³³ In addition, health education programs about the health risks associated with tobacco are warranted to reduce use and to prevent onset of related chronic diseases. Little is known about the exercise and other health habits of Latinos who have immigrated to the United States.^{34–40} To the best of our knowledge, there is paucity in the literature regarding exercise habits of male Latino migrant workers. The primary purpose of this study is to identify exercise habits in male Latino migrant vineyard workers in Oregon. A secondary purpose of this study was to assess the use of tobacco in this population.

METHODS

Participants

A total of 264 male Latino vineyard workers (mean age 33.7 years, *SD* ± 10.5, range 18–78 years) employed at vineyards in Washington and Yamhill counties (Oregon) were recruited to participate in the study. The subjects were recruited at onsite health screening clinics between May and August of 2010. This research study was approved by the Institutional Review Boards of Pacific University (Hillsboro, Oregon) and Tuality Hospital (Hillsboro, Oregon).

Data Collection

Health care providers from the ¡Salud! team (Tuality Health Care, Hillsboro, Oregon) and

volunteer health care professionals from Pacific University (Hillsboro, Oregon) provided health screening clinics at vineyards in Washington and Yamhill counties (Oregon) between the months of May and September in 2010.⁴¹ Numerous services are provided at these onsite health screening clinics, including collecting measures of cholesterol, blood pressure, and body mass index, vaccinations, musculoskeletal examinations and treatment (performed by Pacific University faculty and student physical therapists), optometric examinations (performed by university faculty and student optometrists), dental health services (performed by university faculty and student dental hygienists), mental health services, and health education.^{29,41}

At the start of each health screening clinic, a member of the ¡Salud! health care team, fluent in Spanish, informed the subjects as to the purpose of the research study and provided informed consent (written in Spanish and English). Subjects who signed the informed consent were provided with the exercise habits and tobacco use questionnaire. Subjects were allowed to answer the survey questions while they waited for services.

Measures

The survey, available in both Spanish and English, was designed to assess one's exercise habits and tobacco use. If an individual was unable to comprehend the written questions, a member of the community health team would read the questionnaire and record the subject's answers. Demographic data collected included age, number of years working at vineyards, and the age one began working at a vineyard. Subjects were asked if they exercised; and if so, how many hours a week: less than 1, 1 to ≤ 2 hours, 2 to ≤ 3 hours, 3 to ≤ 4 hours, 4 to ≤ 5 hours, or 5 or more hours a week. Subjects were asked to identify types of exercise activities they participated in: walking, running, soccer (jugar), weight-lifting, and/or "other." Workers were asked if they stretched; and if so, when: before work, during work, and/or after work. Subjects were also asked if they smoked and/or chewed tobacco and to report the frequency of tobacco use.

Statistical Analysis

Statistical analysis was performed using SPSS 17.0 (SPSS, Chicago, IL). Means and standard deviations (*SD*) were calculated for all continuous measures. Counts of reported exercise habits (times per week and types of exercises) were calculated. Counts (and percentage of population) based on age categories were performed for exercise performance, stretching, smoking, and chewing tobacco use. Chi-square analysis was performed to assess for differences in age between the dichotomous variables: exercise yes or no, stretching yes or no, smoking yes or no, and chewing tobacco use yes or no. Independent *t* tests were performed to assess for differences in mean age between those who reported exercise participation (yes or no) and tobacco use (yes or no).

RESULTS

A total of 264 surveys were collected. The mean age of the subjects was 33.7 years (*SD* \pm 10.5). The subjects reported 5.6 years (*SD* \pm 5.1, range 1–27 years) of work at the vineyards, with a mean age starting work at the vineyards of 27.8 years (*SD* \pm 9.7, range 13–77 years).

Table 2 presents the time devoted to exercise each week by the male Latino vineyard workers. The single exercise category with the highest representation was the "no exercise" group (*n* = 110; 41.8% of the population). The highest percentage of those who reported exercising was the "less than 1 hour a week" group (*n* =

TABLE 2. Reported Time Devoted to Exercise Each Week by Male Latino Vineyard Workers

Reported number of hours exercising each week	<i>n</i> per group	Percent of total population
No Exercise	110	41.8%
≤ 1 hour/week	47	17.9%
1 to ≤ 2 hours/week	38	14.4%
2 to ≤ 3 hours/week	26	9.9%
3 to ≤ 4 hours/week	21	8.0%
4 to ≤ 5 hours/week	12	4.6%
≥ 5 hours/week	9	3.4%

47; 17.9% of the population). Each subsequent group presented with a smaller percentage of the population that reported exercising. Only 42 (16%) of the migrant farmworkers reported exercising for 3 or more hours a week. Only 27 (10.2%) of the migrant farmworkers reported performing both aerobic exercise and strength training exercises during the week; however, only 15 out of the 27 performed 3 or more hours of total exercise per week. Review of reported exercise types found the most popular form of exercise was walking ($n = 78$), followed second by running ($n = 58$), soccer third ($n = 47$), weight-lifting fourth ($n = 35$), and “other” fifth ($n = 33$).

One hundred fifty-three (58.2%) subjects reported exercising during the week (Table 3). There was no difference in age between those who reported exercising and those who did not ($p = .78$). Table 4 presents the number of subjects (and percentages of the total population) by age group and exercise habits. Chi-square analysis did not reveal a difference between groups ($p = .15$).

One hundred twenty-three subjects reported stretching (mean age \pm $SD = 33.6 \pm 11$ years). There was no difference in mean age between those who reported stretching and those who did not ($p = .85$) (Table 3). Of those who reported stretching, a majority (62.6%) reported stretching prior to work, followed second by

24.2% stretching during work, with the remaining stretching after work. No difference was found between stretching groups based on chi-square analysis ($p = .75$) (Table 4). A majority of subjects reported not using tobacco (non-smokers 82.9% and non-chewing tobacco users 90.2%) (Table 3). There was no difference in mean age between tobacco users and nonusers ($p = .33$ for smoking; $p = .70$ for chewing tobacco) (Table 3). Those under the age of 40 reported greater tobacco use than their older counterparts. Of those who reported smoking, 32 out of 40 (80%) were under the age of 40. Of those who reported chewing tobacco, 16 out of 23 (70%) were under the age of 40 (Table 5).

Table 6 presents descriptive data for exercise performance and use of a tobacco product. In general, those who reported smoking or using tobacco were just as likely to have reported exercising. However, as a percentage of their respective populations (exercise versus no exercise), workers who reported exercising smoked less (18.9%) or used less chewing tobacco (9.5%) than those who did not report exercising (22.5% smoked and 13.8% used chewing tobacco). A similar relationship between those who did and did not use tobacco was observed when assessing workers who performed both weight-lifting and aerobic exercise. Of those who performed the two forms of exercise, only 14% smoked and 9% used chewing tobacco, whereas those who did not perform a program consisting of aerobic and resistance exercises were more likely to use tobacco (21% reported smoking and 10% reported chewing tobacco). A trend towards less tobacco use was observed in individuals who reported more total hours per week devoted to exercise. Workers who reported 4 or more hours of weekly exercise did not report using any tobacco products.

TABLE 3. Exercise, Stretching, and Tobacco Use Habits in Male Latino Vineyard Workers

Characteristic	<i>n</i>	%	Mean age (years)	<i>SD</i>	<i>p</i> *
Exercise habits					
Yes	153	58.2	33.9	11.4	.78
No	110	41.8	33.5	9.1	
Stretching habits					
Yes	123	52.1	33.6	11.0	.85
No	113	47.9	33.3	9.6	
Smoking habits					
Yes	40	17.1	32.2	11.4	.33
No	194	82.9	34.0	10.6	
Chewing tobacco use					
Yes	23	9.8	34.5	12.8	.70
No	211	90.2	33.6	10.5	

*Independent *t* test.

DISCUSSION

This study provides preliminary data as to the exercise and tobacco use habits in male Latino migrant vineyard workers. This information may be useful to public health professionals as they develop and implement health

TABLE 4. Exercise and Stretching Habits of Male Latino Vineyard Workers by Age Groups

Age range	Exercise				<i>p</i> *	Stretching				<i>p</i> *
	Yes		No			Yes		No		
	<i>n</i>	(%)	<i>n</i>	(%)		<i>n</i>	(%)	<i>n</i>	(%)	
19 and younger	7	(2.7)	2	(0.6)	.15	4	(1.7)	4	(1.7)	.75
20–29	52	(19.8)	40	(15.2)		48	(20.3)	40	(16.9)	
30–39	53	(20.1)	39	(14.8)		37	(15.7)	39	(16.5)	
40–49	27	(10.2)	26	(9.9)		25	(10.6)	25	(10.6)	
50–59	7	(2.7)	1	(0.3)		5	(2.1)	3	(1.3)	
60 and older	7	(2.7)	2	(0.8)		4	(1.7)	2	(0.9)	
Totals	153	(58.2)	110	(41.8)		123	(52.1)	113	(47.9)	

*Chi-square test; yes vs. no.

TABLE 5. Smoking and Chewing Tobacco Habits of Male Latino Vineyard Workers by Age Group

Age range	Smoking				<i>p</i> *	Chewing tobacco				<i>p</i> *
	Yes		No			Yes		No		
	<i>n</i>	(%)	<i>n</i>	(%)		<i>n</i>	(%)	<i>n</i>	(%)	
19 and younger	1	(0.4)	8	(3.4)	.75	1	0.4	8	3.4	.87
20–29	17	(7.3)	68	(29.1)		7	(3.0)	78	(33.3)	
30–39	14	(6.0)	61	(26.1)		8	(3.4)	67	(28.7)	
40–49	5	(2.1)	45	(19.2)		5	(2.1)	45	(19.2)	
50–59	1	(0.4)	5	(2.1)		0	(0.0)	6	(2.6)	
60 and older	2	(0.9)	7	(3.0)		2	(0.9)	7	(3.0)	
Totals	40	(17.1)	194	(82.9)		23	(9.8)	212	(90.2)	

*Chi-square test; yes vs. no.

TABLE 6. Exercise Habits and Tobacco Use in Male Latino Vineyard Workers

	Smoking habits		<i>p</i> *	Chewing tobacco use		<i>p</i> *
	Total (%)			Total (%)		
	Yes	No		Yes	No	
Exercise						
Yes	22 (9.3)	116 (49.2)	.6	12 (5.1)	126 (53.4)	.5
No	18 (7.6)	80 (33.9)		11 (4.7)	80 (36.9)	
Exercise (hours/week)						
No exercise	18 (7.6)	80 (33.9)	.6	11 (4.7)	87 (36.9)	.8
<1	8 (3.4)	34 (14.4)		4 (1.7)	38 (16.1)	
1 to <2	5 (2.1)	29 (12.3)		3 (1.3)	31 (13.1)	
2 to <3	5 (2.1)	19 (8.1)		2 (0.8)	22 (9.3)	
3 to <4	4 (1.7)	15 (6.4)		3 (1.3)	16 (6.8)	
4 to <5	0 (0.0)	10 (4.2)		0 (0.0)	10 (4.7)	
≥5	0 (0.0)	9 (3.8)		0 (0.0)	9 (3.8)	
Weight-lifting and aerobic exercise						
Yes	3 (1.3)	21 (8.9)	.5	2 (0.8)	22 (9.3)	.8
No	37 (15.7)	175 (74.2)		21 (8.9)	191 (80.9)	

*Chi-square test; yes vs. no.

education services and intervention programs for this underserved population.

We found that a majority of male Latino migrant farmworkers fail to meet exercise recommendations. The Centers for Disease Control and Prevention (CDC) has established baseline fitness recommendations for adults.⁴² Adults (aged 18 and older) should, at a minimum, perform strength training exercises 2 days a week and 2½ hours (150 minutes) of “moderate intensity aerobic activity” or 1¼ hours (75 minutes) of “vigorous intensity aerobic activity” during the week or a mix of moderate and vigorous aerobic activity.⁴² We also found that there was no difference in mean age between those who reported exercising and those who did not. This suggests that individuals, regardless of age, should receive educational interventions designed to promote exercise performance.

A majority of subjects reported stretching during the day. Of those who stretch, a majority reported stretching prior to work. This is consistent with our observations of workers performing group stretches at the start of each workday. This information is beneficial because it provides insight as to warm-up practices at some vineyards. Group stretching sessions prior to work are traditionally performed to reduce the risk of some injuries; however, prospective studies are needed to support this practice.

Others have reported exercise habits in different Latino populations. Abraido-Lanza et al. reported “recent exercise activity” in Latinos based on data from the 1991 National Health Interview Survey.³⁸ Slightly more than 60% of all male Latinos reported exercising; however, Abraido-Lanza et al. defined exercise activity as having performed at least 1 of 17 activities or sports during the previous 2 weeks.³⁸ It is possible that despite the reported level of exercise activity participation, males may not have exercised enough to meet the CDC guidelines. The fact that over 55% of all males had at least a minimum body mass index (BMI) of 25.0 (a BMI of 25.0–29.9 is considered “overweight”; a BMI 30.0 or greater is considered “obese”) may have suggested that a portion of that population had not historically exercised to an optimal level.³⁸ According to the CDC, less than 47%

of Latino adults reported either performing a minimum of 30 minutes of moderate-intensity exercise at least 5 days a week or reported performing at least 20 minutes of vigorous-intensity exercises at least 3 days a week for a minimum of 20 minutes per training session.⁴² Ham et al. reported that 42.8% of Latinos performed some form of leisure-time physical activity (LTPA) a minimum of once a week.³⁹ This study demonstrates that a majority are not meeting CDC guidelines. Marquez et al. found that Latinos generally performed less LTPA than Caucasians; however, Latinos performed more occupational physical activities.⁴⁰

Tobacco use in the Latino population has been reported to be as high as 27%.^{42–44} In our study, we found that 17% of the subjects reported smoking; a finding that is consistent with cigarette smoking prevalence in the state of Oregon (all adults = 17.9%).⁴⁴ Almost 10% of subjects in this study reported using chewing tobacco, which is higher than rates reported for the total state population (all adults = 3.9%; males = 7.1%).⁴⁴ An interesting finding was that the majority of workers who used tobacco were under the age of 40. In addition, those who used tobacco were less likely to participate in exercise. The relationship between tobacco use and lower physical activity in this population is consistent with other reports.^{45–47} The aforementioned demographic information may be useful to public health officials when designing and implementing smoking cessation programs. Future investigations should identify the starting age and total years of tobacco use in this population, subjects’ knowledge of health risks, and potential social and cultural aspects associated with tobacco use. In addition, determinants of health habits in those who exercise and do not use tobacco should be compared against those who do use tobacco.

There are several strengths of this study. To the best of our knowledge, this is the first study to report aspects of exercise habits in male Latino vineyard workers. As previously mentioned, a majority of individuals in this population do not meet the minimum CDC exercise recommendations. Second, this study reports types of exercise(s) performed by individuals in this population. The aforementioned findings

may be useful to health care providers when assessing health habits, when providing health education in a community setting, and when promoting exercise participation to a migrant population. Third, this study reports tobacco use in this population. Based on the results of this study, smoking cessation educational programs directed toward Latino males are warranted.

The study does have limitations. One limitation of this investigation was in how the questionnaire was designed. Subjects were asked to identify how much time per week they exercised based on the following categories: less than 1 hour, 1–2 hours, 2–3 hours, 3–4 hours, 4–5 hours, and 5+ hours a week. Due to categorical rankings, we are unable to specifically identify the amount of time spent exercising (e.g., performing aerobic exercise and strength training exercises); therefore, we are unable to specifically identify how many individuals met CDC exercise guidelines. As a result, we are only able to report that 16% of individuals met the aerobic exercise guidelines; however, more may have met the guidelines. Follow-up investigations should create additional exercise time categories or directly ask subjects how much time they devote a week to exercise.

A second limitation to this study is that we were not able to assess the physical activities associated with the occupational tasks performed at the vineyard. Vineyard work can be physically demanding. It is possible that *some* of the tasks performed at work may be of adequate intensity to qualify as a moderate or vigorous intensity activity (Table 1). If that is the case, some additional individuals may be meeting CDC exercise guidelines some of the time. However, it is important to highlight that not all occupational duties meet CDC intensity guidelines and the activities that would be considered as a moderate or vigorous intensity activity may not be consistently performed throughout the season. Some activities, such as truck driving, planting, pruning, and guide tying, may not meet intensity guidelines. It has also been suggested that many occupational activities, regardless of their intensity, may not be performed for a long enough period of time.⁴² In addition, some work-related activities may be associated with the onset of a MSD.¹⁷ A study, utilizing physical

activity monitors (e.g., pedometers, heart rate monitors, load transducers, etc.) is necessary to follow a cohort of vineyard workers in order to assess occupational physical activity levels.⁴⁸

Future investigations should compare exercise and health habits with results from health screening tests (e.g., body mass index, blood pressure, cholesterol, etc.) performed at the onsite clinics. These comparisons may help to identify differences in measures of health between those who do or do not exercise. Personal beliefs, sociodemographic factors, cultural factors, and knowledge of health behaviors should be assessed to determine their potential impact on vineyard workers exercise and tobacco use habits. Finally, as previously mentioned, physical activity should be assessed at work in order to understand the potential health benefits associated with this form of work.

CONCLUSIONS

The results from this study suggest that a majority of male Latino vineyard workers do not perform the minimum exercise levels as recommended by the CDC and this population uses tobacco that is either at rates consistent with or greater than rates found in the total population of the state of Oregon. Future investigations should continue to explore exercise and health habits of Latino migrant farmworkers. In addition, analysis of occupational requirements should be performed to assess if minimum exercise guidelines may be met during work.

REFERENCES

1. Arcury TA, Vallejos QM, Marin AJ, Feldman SR, Smith G, Quandt SA. Latino farmworker perceptions of the risk factors for occupational skin disease. *Am J Ind Med.* 2006;49:434–442.
2. Brower MA, Earle-Richardson GB, May JJ, Jenkins PL. Occupational injury and treatment patterns of migrant and seasonal farmworkers. *J Agromedicine.* 2009;14:172–178.
3. Dwyer J. Illegal immigrants, health care, and social responsibility. *Hastings Center Rep.* 2004;34:34–41.
4. Farquhar S, Samples J, Ventura S, et al. Promoting the occupational health of indigenous farmworkers. *J Immigrant Minority Health.* 2008;10:269–280.

5. National Center for Farmworker Health. Facts about farmworkers. 2010. Available at: <http://www.ncfh.org/docs/fs-Facts%20about%20Farmworkers.pdf>. Accessed May 21, 2012.
6. United States Department of Labor Bureau of Labor Statistics. Foreign-born workers: labor force characteristics—2010. 2011. Available at: <http://www.bls.gov/news.release/pdf/forbrn.pdf>. Accessed June 12, 2012.
7. Kato AE, Fathallah FA, Miles JA, et al. Ergonomic evaluation of winegrape trellis systems pruning operation. *J Agric Saf Health*. 2006;12:17–28.
8. Zuskin E, Mustajbegovic J, Schachter EN, Kern J, Pavicic D. Respiratory function in vineyard and orchard workers. *Am J Ind Med*. 1997;31:250–255.
9. Mariger SC, Grisso RD, Perumpral JV, Sorenson AW, Christensen NK, Miller RL. Virginia agricultural health and safety survey. *J Agric Saf Health*. 2009;15:37–47.
10. McCauley LA. Immigrant workers in the United States: recent trends, vulnerable populations, and challenges for occupational health. *AAOHN J*. 2005;53:313–319.
11. McCauley LA, Anger WK, Keifer M, Langley R, Robson MG, Rohlman D. Studying health outcomes in farmworker populations exposed to pesticides. *Environ Health Perspect*. 2006;114:953–960.
12. National Center for Farmworker Health. Occupational health and safety. 2010. Available at: <http://www.ncfh.org/docs/fs-OCC%20Health.pdf>. Accessed May 21, 2012.
13. Arcury TA, Quandt SA, Mellen BG. An exploratory analysis of occupational skin disease among Latino migrant and seasonal farmworkers in North Carolina. *J Agric Saf Health*. 2003;9:221–232.
14. Arcury TA, O'Hara H, Grzywacz JG, Isom S, Chen H, Quandt SA. Work safety climate, musculoskeletal discomfort, working while injured, and depression among migrant farmworkers in North Carolina. *Am J Public Health*. 2012;102(Suppl 2):S272–S278.
15. Verma A, Schultz MR, Quandt SA, et al. Eye health and safety among Latino farmworkers. *J Agromedicine*. 2011;16:143–152.
16. Sandberg JC, Grzywacz JG, Talton JW, et al. A cross-sectional exploration of excessive daytime sleepiness, depression, and musculoskeletal pain among migrant farmworkers. *J Agromedicine*. 2012;17:70–80.
17. Meyers JM, Miles JA, Faucett J, et al. Priority risk factors for back injury in agricultural field work: vineyard ergonomics. *J Agromedicine*. 2001;8:37–52.
18. Holmberg S, Thelin A, Stiernstrom E, Svardsudd K. The impact of physical work exposure on musculoskeletal symptoms among farmers and rural non-farmers. *Ann Agric Environ Med*. 2003;10:179–184.
19. Brumitt J, Reisch R, Krasnoselsky K, et al. Self-reported musculoskeletal pain in Latino vineyard workers. *J Agromedicine*. 2011;16:72–80.
20. Amirehsani KA. Mexican Americans with type 2 diabetes in an emerging Latino community: evaluation of health disparity factors and interventions. *Home Health Care Manage Pract*. 2010;22:470–478.
21. Moreno C, Alvarado M, Balcazar H, et al. Heart disease education and prevention program targeting immigrant Latinos: using focus group responses to develop effective interventions. *J Community Health*. 1997;22:435–450.
22. Ramirez AG, Suarez L, Chalela P, et al. Cancer risk factors among men of diverse Hispanic or Latino origins. *Prev Med*. 2004;39:263–269.
23. Rocha-Goldberg Mdel P, Corsino L, Batch B, et al. Hypertension Improvement Project (HIP) Latino: results of a pilot study of lifestyle interventions for lowering blood pressure in latino adults. *Ethn Health*. 2010;15:269–282.
24. Tuomilehto J, Lindstrom J, Eriksson JC, et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *New Engl J Med*. 2002;344:1343–1350.
25. Weigel M, Armijos R. Exploratory study of the occupational health and health-seeking of migrant and seasonal farmworkers on the U.S.-Mexico border. *J Immigr Minor Health*. 2012;14:648–656.
26. Hawkes L, May J, Earle-Richardson G, Paap K, Santiago B, Ginley B. Identifying the occupational health needs of migrant workers. *J Community Pract*. 2007;15:57–76.
27. Cooper SP, Burau KE, Frankowski R, et al. A cohort study of injuries in migrant farm worker families in South Texas. *Ann Epidemiol*. 2006;16:313–320.
28. Feldman SR, Vallejos QM, Quandt SA, et al. Health care utilization among migrant Latino farmworkers: the case of skin disease. *J Rural Health*. 2009;25:98–103.
29. Brumitt J, Garside LI, Reisch R, et al. Musculoskeletal healthcare for Latino migrant farmworkers: interprofessional collaboration to provide service and educate future healthcare providers. *Health Interprof Pract*. 2011;1:eP1002.
30. Shah NS, Carrasquillo O. Twelve-year trends in health insurance coverage among Latinos, by subgroup and immigration status. *Health Aff*. 2006;25:1612–1619.
31. US Census Bureau. Income, poverty, and health insurance coverage in the United States: 2009. Available at: <http://www.census.gov/prod/2010pubs/p60-238.pdf>. Accessed June 12, 2012.
32. Vargas Bustamante A, Fang H, Rizzo JA, Ortega AN. Understanding observed and unobserved health care access and utilization disparities among U.S. Latino adults. *Med Care Res Rev*. 2009;66:561–577.
33. Centers for Disease Control and Prevention. U.S. obesity trends. Trends by state 1985–2009. Available at: <http://www.cdc.gov/obesity/data/trends.html>. Accessed July 25, 2012.
34. Garcia CM, Duckett LJ, Saewyc EM, Bearinger LH. Perceptions of health among immigrant Latino adolescents from Mexico. *J Holist Nurs*. 2007;25:81–91.

35. Melillo KD, Williamson E, Houde SC, Futrell M, Read CY, Campasano M. Perceptions of older Latino adults regarding physical fitness, physical activity, and exercise. *J Gerontol Nurs.* 2001;27:38–46.
36. Castro FG, Marsiglia FF, Kulis S, Kellison JG. Lifetime segmented assimilation trajectories and health outcomes in Latino and other community residents. *Am J Public Health.* 2010;100:669–676.
37. Jurkowski JM, Mosquera M, Ramos B. Selected cultural factors associated with physical activity among Latino women. *Women's Health Issues.* 2010;20:219–226.
38. Abraido-Lanza AF, Chao MT, Florez KR. Do healthy behaviors decline with greater acculturation? Implications for the Latino mortality paradox. *Soc Sci Med.* 2005;61:1243–1255.
39. Ham SA, Yore MM, Kruger J, Heath GW, Moeti R. Physical activity patterns among Latinos in the United States: putting the pieces together. *Prev Chronic Dis.* 2007;4:A92.
40. Marquez DX, Neighbors CJ, Bustamante EE. Leisure time and occupational physical activity among racial or ethnic minorities. *Med Sci Sports Exerc.* 2010;42:1086–1093.
41. ¡Salud!. ¡Salud! mission. Available at: <http://www.saludauction.org/services/mission-and-services/>. Accessed August 1, 2012.
42. Centers for Disease Control and Prevention. Physical activity for everyone. March 30, 2011. Available at: <http://www.cdc.gov/physicalactivity/everyone/guidelines/index.html>. Accessed July 25, 2012.
43. Hubert HB, Snider J, Winkleby MA. Health status, health behaviors, and acculturation factors associated with overweight and obesity in Latinos from a community and agricultural labor camp survey. *Prevent Med.* 2005;40:642–651.
44. Centers for Disease Control and Prevention (CDC). State-specific prevalence of cigarette smoking and smokeless tobacco use among adults—United States, 2009. *MMWR Morb Mortal Wkly Rep.* 2010;59:1400–1406.
45. John U, Meyer C, Hanke M, Volzke H, Schumann A. Relation between awareness of circulatory disorders and smoking in a general population health examination. *BMC Public Health.* 2006;6:48.
46. Leino-Arjas P, Solovieva S, Kirjonen J, Reunanen A, Riihimaki H. Cardiovascular risk factors and low back pain in a long-term follow-up of industrial employees. *Scand J Work Environ Health.* 2006;32:12–19.
47. Johansson S-E, Sundquist J. Change in lifestyle factors and their influence on health status and all-cause mortality. *Int J Epidemiol.* 1999;28:1073–1080.
48. Butte NF, Ekelund U, Westerterp KR. Assessing physical activity using wearable monitors: measures of physical activity. *Med Sci Sports Exerc.* 2012;44:S5–S12.