



Colorado Department
of Public Health
and Environment

Health Statistics Section

Alyson Shupe, MSW, Ph.D.,
Section Chief

Survey Research Unit

Becky Rosenblatt, M.A., Director
Mark King
Michael Poisson
Ava Williams

Health Surveys and Analysis Unit

Rickey Tolliver, MPH, Director
Amy Anderson, MPH
Monica Clancy
Angel Mendoza
Janelle Smith

Vital Statistics Unit

Kirk Bol, MSPH, Director
Alison Grace Bui, MPH
Mary Chase
Juanita Galvan
Karl Herndon
Marybeth Jupille, MPH

Public Health Informatics Unit

Paul Turtle, Director
Steven Bromby
Dave Carroll
Amanda Howard
Dale Knochenmus
Christen Lara
Nick Roth
Bruce Straw

GIS and Mapping Services

Mark Egbert
Devon Williford, MPH

4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
(303)692-2160
(800)886-7689

health.statistics@state.co.us
www.colorado.gov/cdphe/hs

Evaluating the interplay of arthritis, obesity, and physical activity among Colorado adults

Amy M. Anderson, MPH, CPH, Health Statistics Section, Colorado Department of Public Health and Environment

Introduction

Regular physical activity is regarded as one of the most beneficial factors for maintaining and improving health across the lifespan. Benefits associated with physical activity include increased longevity, weight control, decreased risk for numerous chronic health conditions, improved mental health, and reduced pain and immobility caused by many forms of arthritis.

According to the *2008 Physical Activity Guidelines for Americans*, substantial health benefits are gained when adults engage in at least 150 minutes of moderate-intensity aerobic physical activity per week.¹ Furthermore, adults who participate in any level of physical activity will see some health benefits. Physical activity is imperative for all adults and a sedentary lifestyle should be avoided.

Arthritis and obesity are common co-morbidities, and arthritis has been implicated as a potential barrier to physical activity among adults with obesity. This report aims to further investigate the interplay between arthritis, obesity, and levels of physical activity.

Methods

Data source

The Colorado Behavioral Risk Factor Surveillance System (BRFSS) is an annual statewide telephone survey of adults ages 18 and older developed by the Centers for Disease Control and Prevention. The Colorado Department of Public Health and Environment conducts the survey using random-digit dialing of households with a landline or cellular phone. In 2011, 13,612 respondents were interviewed.

Definitions

Body mass index (BMI) (kg/m²) is a reliable indicator used in medical and public health practice for approximating body fat composition. BMI was calculated from self-reported height and weight, and individuals with a BMI of 30.0 or greater were classified as obese.

Arthritis was defined as an affirmative response to the question "Have you ever been told by a

doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?”

Physical activity was calculated using the responses from seven questions about the types, frequencies, and durations of non-occupational physical activity in the past 30 days and categorized according to the Guidelines. Individuals were classified as physically inactive if no exercise was reported outside of his or her job, or if only nonaerobic physical activity was reported. Those reporting exercise in the past month equating to less than 150 minutes per week were classified as insufficiently active, and those with 150 minutes or more per week were considered sufficiently active.

Statistical analyses

The data were weighted using iterative proportional fitting, or “raking.” Raking adjusts the data so that groups which are underrepresented in the sample can be accurately represented in the final dataset. These adjustments allow for the generalization of findings to the entire adult population of Colorado. The use of raking reduces nonresponse bias and has been shown to reduce error within estimates.

Descriptive statistics were calculated to determine the prevalence and 95 percent confidence intervals (CIs) for each variable of interest. Multivariate logistic regression was used to calculate adjusted odds ratios (ORs) for the associations between arthritis, obesity, and physical activity levels while controlling for age, sex, race/ethnicity and education level. Statistical analyses were done using SAS 9.3 (SAS Institute Inc., Cary, North Carolina).

Results

In 2011, nearly one-third of obese adults in Colorado also reported ever being diagnosed with arthritis. Overall, nearly 7 percent of Colorado adults had both conditions (Table 1). Another 14 percent of adults were obese and without arthritis. Almost 16 percent of adults had arthritis but had a BMI less than 30.0. The remainder of the adult population did not have either condition.

Older age was associated with a higher occurrence of arthritis as well as having both conditions. Arthritis diagnoses were more common among females. White non-Hispanics had a higher prevalence of arthritis but a lower prevalence of obesity. Obesity and having both conditions were less common among those who completed at least some college.

Table 1. Prevalence of arthritis and obesity among Colorado adults, by selected characteristics, BRFSS 2011.

	Both arthritis and obesity		Arthritis only		Obesity only		Neither condition	
	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)
Total	6.6	(6.1-7.2)	15.5	(14.7-16.2)	14.0	(13.1-15.0)	63.9	(62.7-65.1)
Sex								
Male	6.1	(5.3-6.9)	13.6	(12.5-14.8)	14.9	(13.5-16.3)	65.4	(63.6-67.2)
Female	7.2	(6.4-7.9)	17.5	(16.4-18.5)	13.1	(11.9-14.3)	62.3	(60.7-63.8)
Age								
18-24 years	0.6	(0.0-1.2)	1.2	(0.2-2.2)	9.4	(6.5-12.4)	88.8	(85.6-91.9)
25-34 years	2.3	(1.2-3.5)	6.7	(4.7-8.6)	17.0	(14.0-20.0)	74.0	(70.6-77.5)
35-44 years	4.0	(2.9-5.2)	7.9	(6.3-9.5)	18.4	(16.0-20.8)	69.6	(66.9-72.4)
45-64 years	9.9	(8.8-10.9)	19.3	(18.0-20.7)	14.4	(13.1-15.6)	56.4	(54.7-58.1)
65+ years	12.0	(10.6-13.5)	37.5	(35.6-39.5)	8.0	(6.8-9.2)	42.4	(40.4-44.4)
Race/Ethnicity								
White, non-Hispanic	6.6	(6.0-7.2)	16.7	(15.9-17.6)	12.2	(11.3-13.1)	64.5	(63.2-65.7)
Black, non-Hispanic	9.9	(5.7-14.2)	13.7	(8.1-19.2)	24.4	(17.2-31.6)	52.0	(43.8-60.3)
Hispanic	6.7	(5.1-8.3)	10.9	(8.8-13.0)	19.6	(16.5-22.7)	62.8	(59.2-66.5)
Other, non-Hispanic	4.0	(2.3-5.8)	12.6	(8.8-16.5)	14.2	(9.5-18.9)	69.2	(63.3-75.0)
Education								
Less than high school	8.9	(6.3-11.6)	14.6	(11.4-17.9)	16.2	(12.2-20.2)	60.2	(55.1-65.4)
High school graduate	7.2	(6.2-8.2)	16.0	(14.4-17.6)	16.4	(14.4-18.4)	60.4	(57.9-62.9)
Some college or more	6.0	(5.4-6.6)	15.4	(14.5-16.3)	12.8	(11.8-13.8)	65.8	(64.4-67.1)

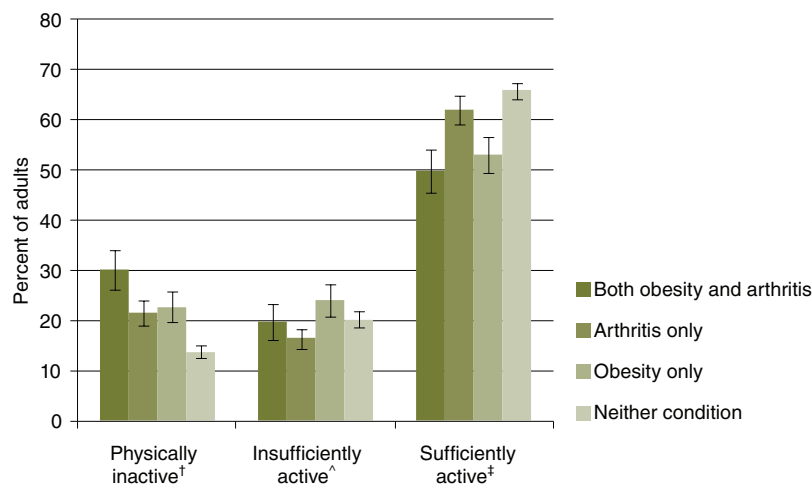
Source: 2011 Colorado Behavioral Risk Factor Surveillance System.

Figure 1 shows the proportion of Colorado adults in each category of physical activity by arthritis and obesity status. Thirty percent of adults with both conditions were physically inactive, which was significantly higher than adults with one condition or the other. Adults without arthritis or obesity were significantly less likely to be physically inactive than adults with one or both conditions.

Adults with only arthritis had a significantly lower prevalence of being insufficiently active than adults with only obesity and, surprisingly, adults with neither condition.

Sufficient physical activity was significantly lower among adults with only obesity or with both conditions. Sixty-two percent of adults with only arthritis met the recommendations for sufficient physical activity, which was similar to adults with neither condition.

Figure 1. Prevalence of varying levels of physical activity* among Colorado adults, by arthritis and obesity status, BRFSS2011.



* Nonoccupational aerobic physical activity in past 30 days.

† No aerobic physical activity.

^ 1-149 minutes/week.

‡ 150 minutes/week or more.

Source: 2011 Colorado Behavioral Risk Factor Surveillance System.

On average, adults with arthritis experience more days of poor physical health per month than those without arthritis regardless of obesity status (Table 2). Additionally, those with arthritis experience more days of activity limitations than adults without arthritis. The prevalence of activity limitations was more than double among adults with only arthritis and those with both conditions as compared to adults with only obesity.

Table 2. Physical and mental health of Colorado adults, by arthritis and obesity status, BRFSS 2011.

	Both arthritis and obesity		Arthritis only		Obesity only		Neither condition	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Average number of days physical health was not good*	7.4	(6.5-8.3)	6.6	(6.0-7.2)	3.1	(2.6-3.6)	2.1	(1.9-2.3)
Average number of days mental health was not good*	5.7	(4.8-6.6)	4.6	(4.1-5.2)	4.5	(3.8-5.1)	2.8	(2.6-3.0)
Average number of days physical or mental health kept from doing usual activities*	7.3	(6.1-8.4)	6.2	(5.4-6.9)	3.7	(2.9-4.5)	2.5	(2.2-2.8)
	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)
Activity limitations due to health problems	54.2	(49.9-58.5)	47.4	(44.6-50.1)	21.9	(19.0-24.7)	15.0	(13.8-16.2)

* In the past 30 days.

Source: 2011 Colorado Behavioral Risk Factor Surveillance System.

After adjusting for age, sex, race/ethnicity, and education level, adults with both obesity and arthritis were 53 percent more likely than adults with only arthritis to be physically inactive (OR: 1.53; 95% CI: 1.20-1.95). Furthermore, adults with both conditions were 35 percent more likely to be physically inactive than adults with only obesity (OR: 1.35; 95% CI: 1.03-1.76). There was no statistically significant difference between adults with only obesity and those with only arthritis (OR: 1.14; 95% CI: 0.88-1.46).

Adults with both conditions were 36 percent less likely to be sufficiently active than adults with only arthritis (OR: 0.64; 95% CI: 0.52-0.79). Differences between adults with both conditions and adults with only obesity did not reach statistical significance (OR: 0.81; 95% CI: 0.64-1.02). However, adults with only obesity were significantly less likely to be sufficiently active than adults with only arthritis (OR: 0.80; 95% CI: 0.66-0.98).

Discussion

Low levels of physical activity were more prevalent among obese adults in Colorado, regardless of arthritis status. However, physical inactivity was much more common among adults with both conditions.

Results from multivariate logistic regression analyses showed significantly higher odds of physical inactivity among adults with both conditions as compared to adults with one condition or the other. Significant differences existed in sufficient physical activity based on obesity status among adults with arthritis, but the same was not true of arthritis status among obese adults. Moreover, adults with only arthritis were more likely to meet recommendations for physical activity than adults with only obesity.

On average, adults with arthritis only and adults with both conditions were not significantly different in terms of days of poor health or activity limitations. Despite having a lower

prevalence of activity limitations and fewer days of poor physical health, adults with only obesity participated in similar levels of physical activity as adults with both conditions.

These findings suggest that obesity is more indicative of inadequate levels of physical activity than arthritis. Despite the known benefits of physical activity for weight loss and managing arthritis, the co-occurrence of arthritis and obesity may act as a unique barrier to initiating physical activity.

Limitations

BRFSS is a cross-sectional study, with exposure and outcome being measured simultaneously. As such, temporality of associations cannot be established. Data collected from BRFSS are self-reported and may be subject to social desirability bias.

Ever being diagnosed with arthritis is not indicative of current joint pain or physical limitations. While measures of poor health and activity limitations were used as a proxy, these limitations may or may not be exclusively related to the conditions of arthritis and/or obesity.

Occupational physical activity was not captured during interviews. Measuring only recreational physical activity may underestimate the true level of physical activity for some individuals.

Only one year of data was used in the analyses. Questions which gauge type, frequency, and duration of physical activity are only asked in odd numbered years. Additionally, changes to the sampling frame, weighting methodology, and physical activity questions in 2011 do not allow for the combination with previous datasets. Combining multiple years of data when available will yield more precise estimates. ❖

References

- 1 U.S. Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Accessed December 4, 2013 from www.health.gov/paguidelines
- 2 Barbour KE, Hootman JM, Murphy LB, Helmick CG. Arthritis as a Potential Barrier to Physical Activity Among Obese Adults—United States, 2007 and 2009. *MMWR* 2011;60(19):614–18.
- 3 Centers for Disease Control and Prevention. About BMI for Adults. Accessed December 4, 2013 from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi