



# No short-term savings in health care expenditures for physically active adults



Julia Chevan\*, Dawn E. Roberts

Springfield College, Springfield, MA, USA

## ARTICLE INFO

Available online 5 March 2014

### Keywords:

Physical activity  
Medical expenditures  
Drug expenditures

## ABSTRACT

**Objective.** The purpose of this study was to investigate the association of physical activity and health care expenditures in a nationally representative sample of non-disabled adults.

**Methods.** This was a secondary analysis of data from 8843 adults. Physical activity measures were derived from participants in the 2006 and 2007 National Health Interview Survey. Demographic and expenditure variables came from the Medical Expenditure Panel Survey data files for panels 12 (2007–2008) and 13 (2008–2009). Multivariable regression models were used to determine the association between levels of physical activity participation and total health care expenditures, drug expenditures, and out-of-pocket health care expenditures.

**Results.** Unadjusted data revealed lower health care expenditures among those whose activity level met the CDC guidelines with greater savings apparent among those who exercised above recommended guidelines. However, in the models that adjusted for age, sex, race, income and health status these differences disappeared.

**Conclusion.** In the short-term, the amount of physical activity undertaken by an adult may have little effect on the expenditures for health services, drugs and the money expended directly out-of-pocket. However, given the benefits of physical activity in terms of chronic disease prevention there are very likely long-term expenditure savings to be had.

© 2014 Elsevier Inc. All rights reserved.

## Introduction

Physical activity is widely accepted as an important element of a healthy lifestyle. There is mounting evidence that individuals who are physically active reduce their risk for a broad range of diseases including cardiovascular disease, diabetes mellitus, colon cancer, breast cancer, osteoporosis and obesity (Warburton et al., 2006). It follows that being active should result in reduced health care expenditures. Monetary savings, especially in the short-term, may be a strong incentive for individual participation in physical activity. The population costs of physical inactivity in the United States (U.S.) are substantial and have been estimated to be 24 billion dollars which, in 1995, equated to 2.4% of the total U.S. health care expenditures (Colditz, 1999). In contrast, the savings at the individual level, for those who are physically active, range from \$330 (1987 dollars) to \$483 (2004 dollars) (Andreyeva and Sturm, 2006; Pratt et al., 2000).

The literature on the savings related to physical activity focuses on the aggregate costs related to being physically inactive because at the individual level, the savings appear rather small (Andreyeva and Sturm, 2006; Finkelstein et al., 2004; Pratt et al., 2000; Wang et al.,

2004). These studies on the economics of physical activity are often not generalizable to the entire adult population as the sampling approaches focus on persons with specific health attributes such as cardiovascular disease (Wang et al., 2004), obesity (Andreyeva et al., 2004; Finkelstein et al., 2004), arthritis (Wang et al., 2001) and mental health issues (Brown et al., 2005; Wang and Brown, 2004) or they are focused on a subset of individuals by age (Andreyeva and Sturm, 2006). Further, in defining physical activity, the construct is most often simplistically dichotomized into active and inactive adults (Andreyeva and Sturm, 2006; Brown et al., 2005; Pratt et al., 2000; Wang and Brown, 2004; Wang et al., 2004). Thus, the purpose of this study was to examine the association of leisure-time physical activity level and short-term health care expenditures in a nationally representative sample of non-disabled adults.

## Methods

### Data sources

This study used data from the 2006 and 2007 National Health Interview Survey (NHIS) sample adult file. The NHIS is a survey conducted by the National Center for Health Statistics to monitor the health of the civilian non-institutionalized U.S. population. We included 8843 non-disabled adults who did not respond that they were unable to perform either moderate or vigorous exercise or who did not have missing data on NHIS questions about leisure-time

\* Corresponding author at: Department of Physical Therapy, Springfield College, 263 Alden Street, Springfield, MA 01109, USA.

E-mail address: [jchevan@springfieldcollege.edu](mailto:jchevan@springfieldcollege.edu) (J. Chevan).

physical activity. Variables extracted from the NHIS identified the frequency and number of minutes of vigorous (activity that causes “heavy sweating or large increases in breathing or heart rate”) or moderate (activity that causes “only light sweating or a slight to moderate increase in breathing or heart rate”) leisure-time activity and the frequency of participation in muscle strengthening activities on a weekly basis.

In order to obtain information about health care expenditures, the NHIS files were linked to the panel 12 and panel 13 Medical Expenditure Panel Survey Household Component (MEPS-HC) longitudinal data files. The MEPS-HC, a survey conducted by the Agency for Healthcare Quality and Research, uses the NHIS as its sampling frame. The sampling frame for panel 12 of the MEPS-HC was the 2006 NHIS and the sampling frame for panel 13 was the 2007 NHIS. The MEPS-HC is designed to estimate population level information about health services utilization and expenditures. Variables extracted from the MEPS-HC included demographics, health status, total health expenditures, drug expenditures and out-of-pocket expenditures.

## Measures

### Explanatory variables

The primary explanatory variables were the measures of physical activity derived from the NHIS files. We first calculated the total number of minutes of vigorous and moderate physical activity that participants reported they completed in a week. Using the 2008 Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services, 2008) which equates 2 min of moderate activity to every 1 min of vigorous activity, we were able to categorize participants' physical activity in two ways. In the first categorization, we identified if participants met the guidelines for both strength and aerobic activity, for only strength or only aerobic activity, or not at all. In the second categorization, we only examined aerobic activity and split up participants as completing 0 min per week, less than 75, 75–149, 150–299 or greater than 300 min. These 2 categorizations enabled us to analyze health care expenditures by level of leisure-time physical activity undertaken in a week.

In addition to the physical activity measures from the NHIS, we used age, sex, race, income and health status all derived from the MEPS-HC as control variables. For race, we classified individuals into 2 categories white/nonwhite. For income, we created 3 categories that classify income in terms of poverty status (a low level which is less than 200% of the poverty level, a middle level which is 200%–399% of the poverty level, and a high level which is at least 400% of the poverty level). For health status, we used the variable that describes self-perceived health status which can be excellent, very good, good, fair or poor.

### Dependent variables

The dependent variables were health care expenditures all derived from the MEPS data. The expenditure data was matched so that for individuals from the 2006 NHIS we used 2007 expenditure variables and for individuals from the 2007 NHIS we used 2008 health care expenditure variables. The three variables of interest were total health care expenditures, which encompasses all health services but excludes drugs, drug expenditures and finally, expenditures incurred that were self-pay which we term as out-of-pocket expenditures. All health care expenditure variables were adjusted to 2012 dollars using the medical consumer price index (U.S. Department of Labor, 2010).

### Data analysis

Descriptive statistics were calculated for the entire sample for each of the explanatory variables, and health care expenditures by physical activity level were determined. Health care expenditure data from MEPS is skewed and contains some zero values (Yu and Machlin, 2004); thus, we employed a two-part model for the analysis of any health care expenditure, any drug expenditure and any out-of-pocket expenditure (Diehr et al., 1999; Mihaylova et al., 2011). In the first part of the model a probit regression was used to estimate the probability of having any expenditure while in the second part of the model a GLM regression with the log link and gamma distribution was employed to model those with a positive expenditure. All analyses were weighted using an adjusted weighting variable that is recommended for analysis when MEPS and NHIS data are merged (Cohen, 2010). Analyses were conducted using the survey commands that incorporated strata and clusters in Stata 12.1 (Stata Corporation, College Station, TX).

## Results

The mean age of our sample of adults was 47.2 years (95% confidence interval, 46.6, 47.9) with 47% being men. The sample was predominantly white (82%) and in terms of the income variable, 39% were classified as high income, 32% as middle and 29% as low. Tables 1, 2 and 3 provide an overview of the sample's characteristics; Table 1 provides a description of the full sample while on Tables 2 and 3 we present this same data stratified by the exercise categories of the two explanatory variables that we used to group leisure time physical activity. We calculated unadjusted average health care, drug and out-of-pocket expenditures by the physical activity categories. The highest expenditures in all three expenditure categories are consistently seen in among the group that did not meet the guidelines, or that was executing 0 min of aerobic activity (Table 4). Health care expenditures by physical activity guideline category seem to have no clear pattern. In the aerobic activity categorization, health services expenditures do appear to decrease by increasing minutes of aerobic activity. The highest drug expenditures are seen in the group reporting 0 min of aerobic activity per week.

Tables 5, 6 and 7 show the results of the two-step models for all of the explanatory variables associated with each of the expenditure dependent variables. Whether it be meeting the physical activity guidelines, or minutes of aerobic activity per week, not a single level of activity was significant in the models for health services expenditures, drug expenditures or out-of-pocket expenditures. In contrast, for the explanatory variables of age, sex, race and perceived health status estimates were consistently significant across these models.

## Discussion

For this study on health care expenditures and physical activity we delved deeper into the concept of physical activity by conducting an

**Table 1**  
Sample characteristics (MEPS/NHIS linked data 2006, 2007, 2008).

Characteristic	Unweighted sample size	Weighted mean or % (95% confidence interval)
Age (years)	–	47.2 (46.6, 47.9)
Sex		
Male	5097	47.3 (46.0, 48.7)
Female	3746	53.7 (51.3, 54.0)
Race		
White	6317	81.9 (80.2, 83.6)
Nonwhite	2526	18.1 (16.4, 19.8)
Ethnicity		
Hispanic	1804	13.6 (12.0, 15.2)
Nonhispanic	7039	86.4 (84.8, 88.0)
Years education		
<12 years	1774	13.9 (12.8, 14.9)
12 years	4300	50.0 (48.4, 51.5)
>12 years	2769	36.2 (34.4, 37.9)
Income		
Low	3490	29.0 (27.5, 30.5)
Middle	2715	31.9 (30.7, 33.1)
High	2638	39.1 (37.5, 40.7)
Perceived health status		
Very good/excellent	4712	58.6 (57.1, 60.0)
Good	2594	27.5 (26.2, 28.7)
Fair/poor	1448	14.0 (13.1, 14.9)
Physical Activity guidelines met		
Neither	4922	51.0 (48.9, 53.0)
Strength only	281	3.0 (2.6, 3.5)
Aerobic only	2312	28.8 (27.2, 30.3)
Both	1328	17.2 (16.1, 18.4)
Aerobic activity minutes per week		
0	3813	38.5 (36.2, 40.8)
<75	1390	15.5 (14.2, 16.8)
75–149	833	9.9 (8.9, 10.8)
150–299	939	11.6 (10.7, 12.6)
>300	1868	24.5 (22.9, 26.1)

Download English Version:

<https://daneshyari.com/en/article/3100528>

Download Persian Version:

<https://daneshyari.com/article/3100528>

[Daneshyari.com](https://daneshyari.com)