# Trends and disparities in the prevalence of physicians' counseling on exercise among the U.S. adult population, 2000–2010

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## ARTICLE INFO

## ABSTRACT

Recognizing the undisputed health benefits of exercise, physicians' counseling has been included in the *Healthy People Objectives* since 2000. To address the paucity of data on such counseling at the national level, we examined changing trends and disparities in receiving physicians' counseling on exercise among the physically-able, non-institutionalized U.S. adult population. Data from the 2000, 2005, and 2010 National Health Interview Surveys (NHIS) were examined using logistic regression that included race/ethnicity, age, gender, education, insurance status, number of physician visits in the past year, and body mass index. In 2000, only 22.9% of NIHS respondents had received counseling on exercise, increasing to 33.6% in 2010. Compared with non-Hispanic Whites, non-Hispanic Blacks were 27% less likely to receive exercise advice in 2000 (adjusted odds ratio [AOR] 0.73, 95% confidence interval [CI] 0.61–0.87). In later years, they were equally likely to receive advice. Although decreased over the years, male respondents were significantly (34% to 23%) less likely to report receipt of exercise counseling than female patients (in 2010: AOR 0.77, CI 0.72–0.83). Uninsured respondents were 35% less likely to report receiving exercise advice from their provider in all study years (2010: AOR 0.64, CI 0.59–0.72). Patients with increasing levels of education were increasingly more likely to report receipt of counseling in each successive survey year. The overall prevalence of physicians' counseling on exercise increased moderately between 2000 and 2010. Some disparities narrowed and even reversed but significant disparities continue to exist across gender, insurance status, and education level.

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## 1. Introduction

Physical activity is vital for maintaining good health, and better quality of life through disease prevention, symptom reduction, improved psychological well-being, and increased longevity (Wannamethee and Shaper, 2001; Fox, 2007; Kujala et al., 1998). It is also well established that morbidity and mortality rates decrease as the overall physical activity rate increases in the population (Vuori et al., 2013). Physical inactivity has become a pressing public health issue in the U.S. About 80% of adults still failed to meet the Physical Activity Guidelines for Americans (Tucker et al., 2011). Physical inactivity is implicated with the development of numerous chronic diseases, the leading causes of death in U.S. (Mokdad et al., 2004). Thousands of lives and substantial health care expenditures can be saved through population-wide adoption of increased levels of exercise. If all inactive Americans were to start exercising regularly, over 10% of all deaths in the U.S. could be prevented or delayed (Lee et al., 2012), and annual health care costs could be reduced by $107.7 billion, in 2016 U.S. dollars (Pratt et al., 2000).

Because of the low rates of physical activity in the U.S. population and sufficient strong evidence of the beneficial health effects of exercise, along with other professional organizations, the American College of Sports Medicine has recommended physicians to promote exercise among patients through brief counseling during their visits (American College of Sports Medicine, 2016). Annually, 84% of Americans see a physician, with an average of two visits per patient, presenting a great opportunity for primary care physicians to reach a wide audience (U.S. Department of Health and Human Services (HHS), 2016). Exercise promotion counseling by physicians has repeatedly been shown to be an effective means of modifying harmful health behaviors and improving general health in a variety of patients (Orrow et al., 2012; Mänty et al., 2009; Fleming and Godwin, 2008; Lin et al., 2010). Lifestyle counseling seems to be most effective at improving exercise habits and increasing levels of physical activity, even up to a year after the counseling took place (Orrow et al., 2012). Given the magnitude of weight-related problem in the U.S., even a modest increase in physical activity levels can make a significant impact in population health (Hospes et al., 2009; Eijsvogels and Thompson, 2015). Recognizing the impact of advice from physicians, exercise counseling has been part of many national

disease prevention guidelines and included as an indicator in all of the *Healthy People Objectives* since 2000 (U.S. Department of Health and Human Services (HHS), 2000). However, despite the ample national efforts to increase physical activity levels in the population, the reported frequency of physicians' counseling on exercise continues to remain quite low, with less than one-third of adults receiving counseling during physicians' visits each year (Glasgow et al., 2001). It is imperative to identify the factors associated with low rates of physicians' counseling and to assess impact on the trend of physicians counseling rates over a decade of national efforts.

To our knowledge, there are no published peer-reviewed studies that have tracked predictors of physicians counseling or changes in disparities over time based on national data. An attempt to fill this gap, we used data from the 2000, 2005, and 2010 National Health Interview Surveys to assess trends and disparities over the decade in receiving of exercise counseling. Our objective also is to identify which demographic groups are facing health services disparities. In doing so, we planned to generate a more precise picture of the clinical practice of exercise promotion by using a more generalizable, national sample beyond local, and small sample used in previous studies (Glasgow et al., 2001; Honda, 2004; Simkin-Silverman et al., 2005; Podl et al., 1999).

## 2. Methods

### 2.1. Data source and study population

The data for this study were obtained from the National Health Interview Survey (NHIS) for the years 2000, 2005, and 2010 (Centers for Disease Control and Prevention (CDC), 2001; Centers for Disease Control and Prevention (CDC), 2006; Centers for Disease Control and Prevention (CDC), 2011). The NHIS is designed and administered by the National Center for Health Statistics (NCHS). The NHIS is a cross-sectional household interview survey conducted on a nationally representative sample of the civilian, non-institutionalized population of the U.S. in which basic health and demographic information is collected.

Since 1997, the questionnaire has consisted of two main sections: Core questions and Supplements. The Core questions are divided into four components: Household, Family, Sample Adult, and Sample Child. In the Household portion, basic demographic information is collected on all household members. The Family portion collects additional demographic information and basic health information from all family members in the household. In each household in the NHIS, one Sample Adult and one Sample Child (if there are any children in the household) are randomly selected and interviewed about more detailed items relating to health status, health services utilization, and health behaviors. The Supplements are used to collect data on other topics, based on current public health needs.

Utilizing a complex survey design, the NHIS follows a multistage area probability sampling method in which households and other non-institutional living facilities can be sampled. The sampling plan is redesigned after every decennial census. The NHIS also employs sample weights in which certain groups (e.g., racial/ethnic minorities) are oversampled and appropriate statistical techniques to correct for design effects (Botman et al., 2000).

### 2.2. Variables and measures

Our sample consisted of adults who were physically able to exercise (i.e., had no physical disability) and who visited a physician or other health care provider in the 12 months prior to completing the survey. These two conditions were used as filter for the sample selection. Those who did not see a physician during this time period were not included in the sample. Receipt of counseling on exercise was assessed by the following question: "During the past 12 months, did a doctor or other health professional recommend that you begin or continue to do any type of exercise or physical activity?"

Several variables were chosen to explore their potential roles as predictors for the receipt of physicians' counseling on exercise. The factors capturing the sociodemographic characteristics of a respondent were age, gender, race/ethnicity, education, insurance coverage status, and number of physician visits in the 12 months prior to taking the survey. Body mass index (BMI), measured as weight [kg]/height [m²], was also measured and was divided into four groups: underweight (<18.5 kg/m2), normal weight (18.5–24.9 kg/m2), overweight (25–29.9 kg/m2), and obese (≥30 kg/m2). Normal weight BMI served as the reference group for comparison. All of the variables examined were either ordinal or nominal. The categories used by the NHIS for each variable, as well as further information on the variables, are listed in Table 1. The variables which were controlled for are as follows: marital status (married or other); household size (1, 2, 3–5, or ≥6); citizenship (U.S. citizenship or non-U.S. citizenship); household income (>$20,000 or ≤$20,000); region of residence (Northeast, Midwest, South, or West); self-reported health status (excellent, very good, good, fair, or poor); and smoking status (non-smoker or current smoker) listed in the footnote of the Table 2.

### 2.3. Statistical analysis

We used a multiple logistic regression model to examine the relationships between receipt of exercise counseling and gender, age, race/ethnicity, education level, BMI, insurance coverage, number of physician office visit for each year (2000, 2005 and 2010) separately. Considering the complexity of combining the 2000, 2005 and 2010 data and challenge in appropriately adjusting for survey design and other effects, the statistical consultant of the NCHS advised to analyze data for each year separately. To adjust and account for the complex survey design effect, the Taylor Series Linearization technique was applied (Centers for Disease Control and Prevention (CDC), 2016). All estimates were generated through using SAS® version 9.3, a software package designed to derive the correct standard errors for complex surveys like the NHIS. The samples consisted of physically-able adults aged ≥18 years who had contact with a physician or other health care provider in past 12 months: 23,656 for the year 2000; 26,152 for the year 2005; and 21,905 for the year 2010. When we have included all the selected variables in the models, one case missing, for example, in one variable led to that case missing in all variables listed in the model, the list-wise cases missing in the models are: Model 2000 missing cases 9.3%; Model 2005 missing cases 8.5%; and Model 2010 missing cases 8.6%. Goodness of fit of the models: C-statistic (C-Index) for the models are 0.700 for Model 2000; 0.696 for Model 2005; and 0.697 for model 2010 indicating model are reasonably well fit.

## 3. Results

The descriptive statistics on sociodemographic variables, BMI, and receipt of exercise counseling for the samples can be viewed in Table 1. In 2000, 22.9% (95% confidence interval [CI] 22.0–23.8) of the sample had received counseling on exercise from a healthcare provider in the past 12 months, and this increased to 30.4% (CI 29.7–31.0) in 2005 and 33.6% (CI 32.8–34.4) in 2010. Obesity prevalence increased from 26.8% (CI 26.3–27.4) in 2000 to 27.2% (CI 26.7–27.8) in 2005 and to 30.8% (CI 30.1–31.5) in 2010.

Our regression model identified significant predictors for patients' receipt of exercise counseling from healthcare providers (Table 2). Gender-related disparities in the receipt of counseling decreased over time, still, remained significant, with men being 34% less likely to be counseled from 2000 adjusted odds ratio ([AOR] 0.66, CI 0.59–0.73) to 23% in 2010 (AOR 0.77, CI 0.72–0.83). There was a noticeable increase in prevalence of physician advice on exercise with advancing age up to 74, and this pattern remained fairly stable over the years of the survey. The likelihood of receiving counseling was highest ages between 45 and 74 (in 2010: AOR.2.75 CI 2.38, 3.17).