

# The Association between Osteoporosis and Early Menopause following Hysterectomy

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## Abstract

This study is to **examine the association between osteoporosis and demographic and behavioral factors in women of age 50 and older who had undergone hysterectomies prior to reaching natural menopause**. The 2009-2010 National Health and Nutrition Examination Survey (NHANES) was analyzed using multiple logistic regressions analysis. Osteoporosis was inversely associated with demographic and behavioral factors. Non-Hispanic Whites of the age of 36-45 at the time of the hysterectomies were significantly associated with osteoporosis. This study may drive positive social change by facilitating public health to promote and implement effective behavioral interventions in women.

## Problem

Despite the available information regarding osteoporosis among postmenopausal women, osteoporosis is still a public health concern in the United States.

1. **The Loss of bone mineral density** accelerates perimenopause or menopause transition, leads to menopause, and ultimately develops postmenopause (Aggarwal et al., 2011).
2. **Hysterectomy among reproductive-age women** is one of the factors that contributes to the early onset of menopause (Hunter et al., 2012).

## Purpose

The purpose of this **quantitative study** is to explore the association between osteoporosis and demographic and behavioral factors among hysterectomized postmenopausal women to drive positive social change by facilitating public health's effective behavioral intervention implementation.

This study potentially impacts positive social changes to the

- Adult population
- American Public Health Association
- Centers for Disease Control Prevention
- National Osteoporosis Foundation
- Hysterectomy Association

## Relevant Literature

- The Integrated Theory of Health Behavior Change has been appropriately adopted into health-related interventions or programs for public health. Recent studies indicated that menopause leads to osteoporosis, and hysterectomy, which is surgical menopause (Fu et al., 2011; Fletcher et al., 2013).
- In the United States, approximately 600,000 hysterectomy surgeries are performed every year, in which one in nine women undergoes removal of the uterus (Wright et al., 2013).
- Researchers investigating the relationship between hysterectomy and osteoporosis in postmenopausal women who had hysterectomies reported that there was an increase in the risk of osteoporosis (Fletcher et al., 2013).
- A hysterectomy is significantly associated with low bone mineral density, which contributes to osteoporosis (Fletcher et al., 2013).

## Research Questions

Is there an **association between osteoporosis prevalence and demographic and behavioral factors** in women age 50 and older who had undergone hysterectomies prior to the onset of natural menopause?

### Demographic Factors:

- Age
- Race/Ethnicity
- Education
- Annual Family Income
- Age at Hysterectomy

### Behavioral Factors:

- Physical Activity (= Moderate Recreational Activity)
- Calcium/Vitamin D Intake

## Procedures

### Participants

**U.S. noninstitutionalized postmenopausal women** who had undergone hysterectomies prior to menopause.

### Sampling Process

- A stratified multistage probability sampling
- NHANES screened sample size
  - **Sample size** - Women age 50 and older based on the sample size computation

## Data Analysis

Multiple logistic regression analysis – Crude odds ratios (ORs) and adjusted ORs

## Findings

### 1. Osteoporosis Prevalence

#### Demographic Factors:

- Age, education, and family annual income were **inversely associated**.
- Non-Hispanic White group (55.7%) is **highly associated** followed by Mexican American (13.6%) and other Hispanics (7.5%).

#### Behavioral Factors:

- Physical activity was **associated**, but calcium/vitamin D was **not**.
- **Age at hysterectomy 36-45 (38.2%) was the highest prevalence** followed by the ages at hysterectomy 26-35 (28.9%), 46-50 (26.3%), and 25 and younger (6.6%) in hysterectomized postmenopausal women.

### 2. The Crude and Adjusted Odds Ratios and 95% Confidence Intervals (CIs)

#### Demographic Factors:

For both crude/adjusted odds ratios,

- Overall, age, race/ethnicity, and education were **significant**. However, annual family income level and age at hysterectomy were **not**.

#### Behavioral Factors:

- Calcium/vitamin D Intake and physical activity (= moderate recreational activity) were **significant**.

## Limitations

- The NHANES dataset is not designed to make inferences regarding temporal sequences of the study.
- The data are difficult to achieve an appropriate geographical representative spread
- The self-report survey questionnaires may potentially misrepresent their responses.
- The limited small sample size data selection - Some race/ethnic groups, hysterectomy, and a lack of physical activity participants in the study.

## Conclusions

- The findings of this **epidemiologic public health study** support the study hypothesis that there is a relationship between **demographic and behavioral factors and the prevalence of osteoporosis**.
- **The non-Hispanic White group of the age of 36-45** at the time of the hysterectomies was significantly associated with osteoporosis.

## Social Change Implications

- The study findings may aid public health policymakers to promote and implement effective behavioral interventions to **prevent osteoporosis in the potential hysterectomized postmenopausal women**.
- The approach may contribute to meet the objectives of **Healthy People 2020** that target 5.3 percent of osteoporosis prevalence in the older US population (HHS, 2015b, para. 2).

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