# Statins and Male Sexual Health: A Retrospective Cohort Analysis

Richard Davis, MD,* Kelly R. Reveles, PharmD,†‡ Sayed K. Ali, MD,§ Eric M. Mortensen, MD, MSc,¶** Christopher R. Frei, PharmD, MSc,†‡ and Ishak Mansi, MD¶**

*Department of Medicine, Brooke Army Medical Center, Fort Sam Houston, TX, USA; †Pharmacotherapy Division, College of Pharmacy, The University of Texas at Austin, Austin, TX, USA; ‡Pharmacotherapy Education and Research Center, School of Medicine, University of Texas Health Science Center, San Antonio, TX, USA; §VA South Texas Health Care System, University of Texas Health Science Center, San Antonio, TX, USA; ¶VA North Texas Health Care System, Dallas, TX, USA; **Department of Medicine & Clinical Sciences, Division of Outcomes and Health Services Research, University of Texas Southwestern, Dallas, TX, USA

DOI: 10.1111/jsm.12745

**ABSTRACT**

***Introduction.*** Conflicting reports exist regarding the role of statins in male gonadal and sexual function. Some studies report a beneficial effect, particularly for erectile dysfunction (ED), through statins' anti-inflammatory and cardiovascular protective properties. Others suggest that statins might be associated with sexual dysfunction through negative effects on hormone levels.

***Aim.*** This study aims to compare the risk of gonadal or sexual dysfunction in statin users vs. nonusers in a single-payer healthcare system.

***Methods.*** This was a retrospective cohort study of all male patients (30–85 years) enrolled in the Tricare San Antonio market. Using 79 baseline characteristics, we created a propensity score-matched cohort of statin users and nonusers. The study duration was divided into a baseline period (October 1, 2003 to September 30, 2005) to describe patient baseline characteristics, and a follow-up period (October 1, 2005 to March 1, 2012) to determine patient outcomes. Statin users were defined as those prescribed a statin for ≥3 months between October 1, 2004 and September 30, 2005.

***Main Outcome Measures.*** Outcomes were identified as the occurrence of benign prostatic hypertrophy (BPH), ED, infertility, testicular dysfunction, or psychosexual dysfunction during the follow-up period as identified by inpatient or outpatient *International Classification of Diseases*, *9th Revision*, *Clinical Modification* codes. Logistic regression was used to determine the association of statin use with patient outcomes.

***Results.*** Of 20,731 patients who met study criteria, we propensity score-matched 3,302 statin users with 3,302 nonusers. Statin use in men was not significantly associated with an increased or decreased risk of BPH (odds ratio [OR] 1.08; 95% confidence interval [CI] 0.97–1.19), ED (OR 1.01; 95% CI 0.90–1.13), infertility (OR 1.22; 95% CI 0.66–2.29), testicular dysfunction (OR 0.91; 95% CI 0.73–1.14), or psychosexual dysfunction (OR 1.03; 95% CI 0.94–1.14).

***Conclusions.*** Statin use was not associated with increased risk of being diagnosed with gonadal or sexual dysfunction in men. Further studies using a larger sample may be needed. **Davis R, Reveles KR, Ali SK, Mortensen EM, Frei CR, and Mansi I. Statins and male sexual health: A retrospective cohort analysis. J Sex Med 2015;12:158–167.**

***Key Words.*** Benign Prostatic Hypertrophy; Erectile Dysfunction; Male Infertility; Testicular Dysfunction; Psychosexual Dysfunction; Statin

**Funding source:** No funding was provided for the conduct of this study or the preparation of this article. CRF was supported by the U.S. National Institutes of Health (NIH) in the form of a NIH/KL2 career development award (RR025766) during the conduct of this study.

**Disclaimer:** The views expressed herein are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, Veteran Affairs, or the US Government. The authors are employees of the US government. This work was prepared as part of their official duties and, as such, there is no copyright to be transferred.

 

## Introduction

Male sexual health has emerged as a major public health concern in the United States, particularly as the population ages and develops coexisting medical conditions. Sexual dysfunction is increasingly common among U.S. men. It is estimated that erectile dysfunction (ED) affects 18 million men in the United States [1]. Furthermore, benign prostatic hypertrophy (BPH) affects more than half of men age 60 years and older and can result in reduced sexual function [2,3]. Finally, these conditions may have a significant negative impact on quality of life and result in substantial healthcare costs [3–6].

Prior studies have demonstrated an association between hyperlipidemia and increased risk of sexual dysfunction, mediated through endothelial dysfunction and inflammation [7]. ED frequently precedes cardiovascular disease and may serve as an early maker of disease progression [8]. Lipid-lowering drugs, such as 3-hydroxyl 3-methylglutaryl-coenzyme A (HMG-CoA) reductase inhibitors (i.e., statins), have been hypothesized to reduce sexual dysfunction in men; however, results are conflicting. Several studies have associated statins with gonadal and sexual dysfunction, including ED, lower testosterone levels, and decreased libido [9–11]. On the other hand, statins ameliorate endothelial dysfunction and increase nitric oxide bioavailability, which can improve ED [12–14]. Furthermore, the anti-inflammatory properties of statins may result in a decreased risk for the development of BPH; however, few studies have evaluated this association [15].

In light of the limited and conflicting evidence regarding statins and gonadal and sexual function, the objective of this study is to examine the risks of gonadal and sexual dysfunction among statin users and nonusers in a large cohort of patients from a single-payer healthcare system.

## Methods

### Study Design

The study was approved by the Brooke Army Medical Center Institutional Review Board, San Antonio, Texas. The study population and database characteristics have been published elsewhere [16]. In short, this was a retrospective cohort study of patients enrolled in the San Antonio Tricare catchment area. We collected longitudinal data using the Military Health System Management Analysis and Reporting Tool (M2) from October 1, 2003 through March 1, 2012. The M2 application is used for administrative monitoring, outcome tracking, and correlational research [17–20]. This system is comprised of outpatient medical records, inpatient medical records, benefits claims for health care delivered outside the military health system, laboratory data, and pharmacy data. The laboratory data include all tests performed within the military healthcare system and results of those tests. Pharmacy data include all pertinent patient demographics and medication dosing information regardless of point-of-care location.

The study was divided into two sequential time periods: an initial period from October 1, 2003 to September 30, 2005 to establish the baseline patient characteristics, and a follow-up period from October 1, 2005 to March 1, 2012 to assess patient outcomes.

### Patient Population

Patients were included in this study if they: (i) were enrolled in Tricare Prime/Plus during fiscal year (FY) 2010 in the San Antonio catchment area; (ii) were 30–85 years old; (iii) had at least one outpatient visit during both the baseline (FY 2003 to 2005) and follow-up (FY 2006 to March 1, 2012) periods; and (iv) received at least one prescription medication during the baseline period.

Three groups of patients were excluded from the study. The first group included trauma and burn patients as identified by *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) codes. We excluded this group because patient outcomes may be attributed to the severity of trauma or burn rather than the statin. Burn patients were identified using ICD-9-CM codes identified by the Agency for Healthcare Research and Quality Clinical Classifications Software (AHRQ-CCS), category 240 [21]. We also excluded patients who began a statin after the end of the baseline period, to allow for equal duration of follow-up for statin users and nonusers. Finally, we excluded transient statin users who received statin medications for less than 90 days.

### Treatment Groups

The exposure variable was the use of a statin during FY 2005 (October 1, 2004 to September, 30, 2005) for 90 days or longer as identified from pharmacy data. Based on this exposure variable, we divided our cohort into two groups: (i) statin users: patients who received and filled a statin medication for at least 90 days in FY 2005; and (ii) nonusers: