Investigating Gender-Related Implicit Bias in Reverse Shoulder Arthroplasty

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INTRODUCTION: Since the FDA approved reverse shoulder arthroplasty (RSA) in 2003, its incidence has significantly increased due to its effectiveness in treating various shoulder pathologies. Initially introduced for primary rotator cuff arthropathy and revision arthroplasty, RSA's indications have expanded to include glenohumeral osteoarthritis, irreparable rotator cuff tears, inflammatory arthritis, fractures, tumors, and chronic joint dislocations. From 2012 to 2017, the annual incidence of RSA in the United States nearly tripled. Despite its success in reducing pain and improving quality of life, RSA is associated with notable postoperative complications such as instability, fractures, and infections. Identified risk factors include age, female sex, obesity, comorbidities, and implant design. Recent studies have highlighted potential sex-based differences in outcomes, with some suggesting that males achieve higher postoperative scores, while others report comparable outcomes between sexes. However, the literature remains limited and heterogeneous, making definitive conclusions difficult. This study aims to explore sex-specific differences in RSA outcomes and complication rates, addressing potential gender-related biases in surgical decision-making. Understanding these differences is crucial for optimizing surgical approaches and improving outcomes, particularly for female patients who may experience worse outcomes due to higher preoperative disability rates and fracture incidence.

METHODS: A systematic review was conducted. A comprehensive search was performed using the databases PubMed, Wiley Cochrane Library, and Web of Science: ‘reverse shoulder arthroplasty’ AND ‘gender’ OR ‘sex’. The search included articles up to 2023. Two authors independently screened the articles, first by title and abstract, then by full text, using inclusion criteria of studies involving human subjects who underwent RSA, reporting outcomes for both sexes, and written in English. Exclusion criteria included in vitro or in vivo studies, non-English articles, studies on surgeries other than RSA, review articles, and case reports. Data extracted included publication details, study type, patient demographics, and sex-disaggregated outcome data. A third author resolved any selection disagreements. Data was organized in an Excel table, and studies were evaluated for bias and quality of evidence. Statistical analyses were performed using SPSS, applying the ANOVA for group comparisons. Heterogeneity was assessed with the I^2 statistic and Cochran's Q, visualized through funnel plots.

RESULTS: The study analyzed 10 articles comprising a total of 24,406 patients who underwent reverse shoulder arthroplasty (RSA). Patient demographics revealed that females were generally older than males across studies, with mean ages ranging from 67.6 to 79.4 years for females and 66.9 to 78.8 years for males. Preoperative body mass index (BMI) and comorbidities such as diabetes and smoking status were comparable between sexes. Postoperative patient-reported outcome measures showed improvements in both Constant and ASES scores for males and females, though males generally reported slightly higher postoperative scores. Postoperative complications were slightly higher in females (10.61%) compared to males (9.89%), with infection rates being notably higher in males (1.03%) compared to females (0.34%). However, males experienced higher rates of revision surgery (5.14%) compared to females (4.48%). These findings highlight the importance of considering sex-specific differences in outcomes and complications following RSA, emphasizing the need for tailored surgical approaches to optimize patient care.

DISCUSSION AND CONCLUSION: Despite the overall improvement in functional outcomes and range of motion for both sexes, males generally reported higher postoperative scores on both the Constant and ASES scales. These findings suggest that while RSA is effective for both men and women, males may experience slightly better functional recovery. However, the complication rates were marginally higher in females, particularly in terms of total complications and specific issues such as deep vein thrombosis and acromial fractures. Males had a higher incidence of infections and revision surgeries, indicating a complex interplay of factors influencing postoperative recovery. The older age of female patients at the time of surgery, coupled with their higher preoperative disability rates, may contribute to the observed differences in outcomes.