

# An 8-item Modified Frailty Index With Nutritional Status Is an Effective Risk Assessment Tool in Total Hip Arthroplasty: Analysis of 223,359 Patients

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**INTRODUCTION:** Total Hip Arthroplasty (THA) is a common operation designed to restore joint function and relieve pain. Risk stratification is necessary and modified frailty indices (MFI) composed of preoperative factors have been proposed. We designed an 8-item MFI that includes nutritional status in the form of serum albumin measurements to quantitatively assess patient frailty. We sought to determine if the 8-item MFI is predictive of postoperative complications following THA in a proof-of-concept assessment. We hypothesized that patients with higher MFI scores will have greater complication rates after THA.

**METHODS:** We reviewed the American College of Surgeons - National Surgical Quality Improvement Program (ACS - NSQIP) and found 223,359 patients who underwent THA between 2015 and 2020. We designed an 8-item MFI including severe obesity (BMI >35), a diagnosis of osteoporosis, non-independent function status prior to surgery, congestive heart failure within 30 days of surgery, hypoalbuminemia (serum albumin <3.5 g/dL), hypertension requiring medication, type 1 or type 2 diabetes, and a history of COPD or pneumonia. Patients were assigned an MFI score based on their number of risk factors. Postoperative outcome measures included 30-day mortality rate, 30-day complication rates, Clavien-Dindo IV complications, length of stay, reoperation rate, and readmission rate.

**RESULTS:** We found that with increasing MFI score, patients were more likely to be readmitted ( $p < 0.001$ ), need reoperation ( $p < 0.001$ ), had higher rates of any complications following surgery ( $p < 0.001$ ), wound complications ( $p < 0.001$ ), and higher odds of Clavien-Dindo IV complications ( $p < 0.001$ ). Comparing MFI 0 to other groups, patients in the MFI 1 group were 11.25 times more likely to experience pulmonary complications ( $p < 0.001$ ), patients in the MFI 2 group were 65.58 times more likely to experience pulmonary complications ( $p < 0.001$ ), and patients in the MFI 3 group were 468.12 times more likely to experience pulmonary complications ( $p < 0.001$ ). Patients with higher MFI scores were also more likely to have adverse patient discharge and increased odds of a delayed stay of at least 5 days ( $p < 0.001$ ). Lastly, the rate of mortality within 30 days was found to be greater with increasing MFI ( $p < 0.001$ ).

**DISCUSSION AND CONCLUSION:** We found that an 8-item MFI involving nutritional status predicted increased odds of complications, reoperation, readmission, and 30-day mortality after THA.

Variable	MFI 0	MFI 1	MFI 2	MFI 3
30-day mortality	0.001	0.002	0.005	0.012
30-day complication rate	0.01	0.02	0.05	0.12
Clavien-Dindo IV complications	0.001	0.002	0.005	0.012
Length of stay	3.5	4.2	5.1	6.5
Reoperation rate	0.001	0.002	0.005	0.012
Readmission rate	0.001	0.002	0.005	0.012

