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Introduction: Inequities in health outcomes based on socioeconomic status (SES) are well documented, yet their impact on the completeness of clinical data remains underexplored. This study evaluates how SES influences the completeness of follow-up data in the UK Non-Arthroplasty Hip Registry and assesses the efficacy of data imputation methods in enhancing the prognostic models.

Method: We examined the records of 16,039 patients from November 2013 to March 2024, correlating UK national indices of multiple deprivation (IMD) with the missingness of various variables using chi-squared analysis. Sequential, multiple imputation by chained equations was used to estimate missing iHOT-12 scores preoperatively, and at 6 months, 1 year, and 2 years postoperatively.

Results: Significant associations were found between IMD and the likelihood of missing follow-up data across several variables, including funding type, treatment approach, and surgical experience. The IMD's correlation with missing data indicated that patients from lower SES backgrounds were less likely to have complete follow-up records. Imputation results showed no significant differences in imputed iHOT-12 scores across deprivation deciles at follow-up periods (p<0.05), suggesting that data imputation effectively balanced the dataset for analysis.

Conclusion: The presence of SES-related disparities in data completeness can significantly skew outcome assessments in clinical research. By employing advanced imputation techniques, this study not only adjusted for missing data but also enhanced the reliability and validity of the prognostic models in predicting outcomes from arthroscopy. The findings underscore the importance of integrating robust methods to address potential biases in healthcare related AI research, ensuring that findings are reflective of all patient groups regardless of socioeconomic status. This approach is vital for developing equitable AI modelling in healthcare.

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