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Overlooking regression to the mean leads to unwarranted interpretations: Letter concerning, “Do obese and extremely obese patients lose weight after lumbar spine fusions? Analysis of a cohort of 7303 patients from the Kaiser national spine registry”

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Akins et al.¹ conclude that after spine fusion surgery, groups with obesity are more likely to lose weight than those without, and note, “Our results provide additional information that lumbar fusion may play a beneficial role in a post-surgical weight loss plan.” However, because this study categorized participants into groups based on extreme values of BMI at baseline and did not compare findings to a control group, these conjectures are not supported by the analysis. Instead, the results are plausibly explainable by Regression to the Mean (RTM)^{2,3}.

Regression to the mean is a statistical phenomenon with potentially serious implications leading to erroneous conclusions in obesity research⁴. With RTM, subjects with extreme deviations from the mean on one variable (e.g., baseline BMI) will exhibit less extreme deviations on the repeated measure (e.g., follow-up BMI). Interpretive error occurs when this decrease is attributed to intervention^{2,3}.

Because the conclusions of this study could influence the decision of clinicians to recommend (and of patients to undergo) surgery, it is crucial to acknowledge problematic methodology that invalidate the analysis used to justify the conclusions. Greater recognition of how RTM can be misperceived as treatment effects is needed by investigators, reviewers, and editors within obesity research.

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