Does Height Matter? The Effect of Operator Height on Exposure Level in the Interventional Suite

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Purpose:

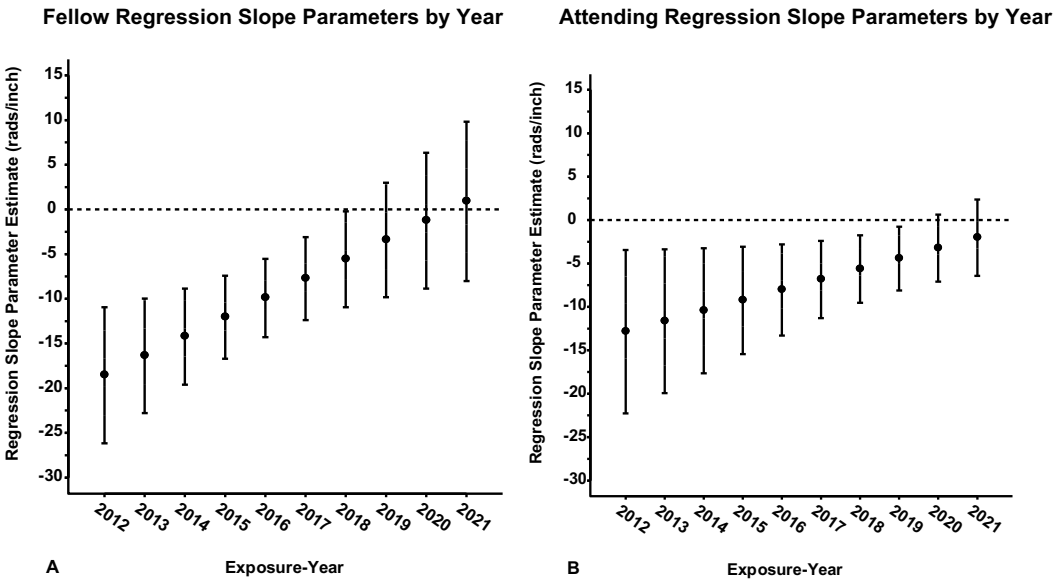
- To demonstrate the relationship between operator height and annual occupational dose equivalents of interventional radiologists.

Methods:

- Dosimeter data for fellow (n=49) and attending (n=8) interventional radiologists were obtained for academic years 2012-2021.
- Twelve-month averages of monthly deep dose equivalents were compared to self-reported heights of each operator and analyzed by year using multivariate ordinary least squares (OLS) and t-statistics.
- Regression slope parameter estimates (rads/inch) used to demonstrate strength of correlation between operator height and occupational dose.

Results:

- Operator height (fellow [p< 0.001], attending [p< 0.012]) explained significant components of yearly average procedure radiation exposure variability.
- This interaction also depended on academic-year (fellow [p< 0.001], attending [p< 0.001]).
- Overall, multivariate regression model explained 65% (R2 =0.65, p< 0.001) of fellow and 60% (R2 =0.60, p< 0.001) of attending variability in yearly average radiation exposure over the academic years 2012-2021.



Note that when the 95% confidence interval includes the hatch horizontal line (where slope = 0), the null hypothesis that the underlying true slope parameter is 0 fails to be rejected at 0.05 significance level.

Figure A:

- Regression slope parameters for fellows were negative between 2012-2018, signifying a significant negative relationship between height and occupational dose up until 2018.
- It lost significance in from 2019-2021

Figure B

- Regression slope parameters for attendings were negative between 2012-2019, signifying a negative relationship between height and dose up until 2019
- It lost significance in 2020 and 2021.

Discussion:

- Similar to previous studies, the majority of academic years analyzed demonstrates a significant negative correlation between operator height and annual occupational dose equivalents.[1,2]
- These findings imply that shorter operators receive higher doses of radiation exposure when compared to their taller colleagues.
- This study also found that the relationship between operator height and occupational dose depends on the year of data collection, with the strength of negative correlation decreasing for both fellow and attending physicians through the observation years.
- Collectively, these results suggest that recent advancements in safety equipment and improved operator awareness may be decreasing the disparity of occupational exposure based on operator height.

References:

1. Wilson-Stewart, Kelly S., et al. “Taller Staff Occupationally Exposed to Less Radiation to the Temple in Cardiac Procedures, but Risk Higher Doses during Vascular Cases.” *Scientific Reports*, vol. 10, no. 1, 1, Sept. 2020, p. 16103. *www.nature.com*, https://doi.org/10.1038/s41598-020-73101-4.
2. Faroux, Laurent, et al. “IMPACT OF THE TABLE HEIGHT AND THE OPERATOR’S HEIGHT ON THE LEVEL OF RADIATION DELIVERED TO INTERVENTIONAL CARDIOLOGISTS.” *Radiation Protection Dosimetry*, vol. 187, no. 1, Dec. 2019, pp. 21–27. *Silverchair*, https://doi.org/10.1093/rpd/ncz131.

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