Examining Diagnostic Radiology Residency Case Volumes from a Canadian Perspective: A Marker of Resident Knowledge

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Introduction

- New guidelines from the Accreditation Council for Graduate Medical Education (ACGME) have proposed minimum case volumes to be obtained during residency but there are currently no minimum case volumes standards for radiology residency training in Canada.
- Having a set of prognostic markers that will help predict resident success will be important in the new Canadian radiology residency curriculum. Close and frequent tracking of resident performance will also be required.
- This new curriculum has come in the form of competency-based medical education (CBME) throughout Canada. At Queen's University, we were the first Canadian program to transition to a CBME model, and with it, more quantitative measures of resident achievement are needed to assess resident success.
- Thus this study investigated radiology resident case volumes among recently graduated cohorts of residents and determined if there is a correlation between case volumes and measures of resident success.
- We hypothesized that larger case volume would correlate positively with increased success as measured by subjective assessments.

Purpose

To examine radiology resident case volumes among recently graduated cohorts of residents and determine if there is a link between case volumes and measures of resident success.

Methods

Data Collection

- Resident case volumes for three cohorts of graduated residents (2016-2018) were extracted from the institutional database.
- Achievement of minimum case volumes based on the ACGME guidelines was performed for each resident (n = 9).

Data Analysis

- Pearson correlation analysis was performed to examine the relationships between resident case volumes and markers of resident success including residents' relative knowledge ranking and their American College of Radiology (ACR) in-training exam scores.
- Descriptive statistics.

Results

Descriptive statistics

- Table 1 shows that the average number of cases performed by the residents was 7459 with a considerable amount of variability (SD = 824.2).
- The mean percentile score on the ACR in training exam was 53.4 with a standard deviation of 30.5 (See Table 1).

Table 1: Descriptive statistics of all variables used in the analysis

	Mean	SD	Minimum	Maximum
Nunber of cases	7459.33	824.22	6146.00	8774.00
Knowledge ranking	5.00	2.74	1.00	9.00
Percentile scores	53.44	30.50	5.00	87.00
[1]No. of deficient categories achieved per ACGME	-2.78	1.39	-5.00	-1.00
N	9			

Note: [1]Negative values refer to the amount of deficient categories per ACGME minimum standards.

Correlation Analysis

- Results from the correlational analysis shown in Table 2 reveals a strong positive and statistically significant correlation between the total number of cases performed by a resident and their relative knowledge ranking (r = 0.682, p < 0.05).
- As Figure 1 shows, the majority of the observations are clustered around the line of best fit, confirming the observed strong relationship.
- There was a non-significant and weak positive correlation between the total number of cases performed by a resident and their ACR in-training percentile score (r = 0.138, p > 0.05). See Table 2.
- There was a strong and statistically significant positive correlation between residents' relative knowledge ranking and ACR in-training percentile score (r = 0.715, p < 0.05). This finding is clearly depicted and confirmed in Figure 2 where nearly all the observed values are closer to the line of best fit.
- Results from Table 2, however, suggests that decreasing the number of deficient categories achieved by residents per ACGME guidelines was not significantly correlated with any other variable of interest, despite its moderate to strong positive associations with residents' knowledge ranking (r = 0.536, p > 0.05) and number of cases performed (r = 0.622, p > 0.05).

Table 2: Pairwise Pearson's correlations examining relationships among all variables used in the analysis

	Nunber of cases	Knowledge ranking	Percentile scores	No. of deficient categories achieved per ACGME
Nunber of cases	1.000	----	----	----
Knowledge ranking	0.682*	1.000	----	----
Percentile scores	0.138	0.715*	1.000	----
No. of deficient categories achieved per ACGME	0.536	0.622	0.315	1.000

Statistical signficance: *p < 0.05

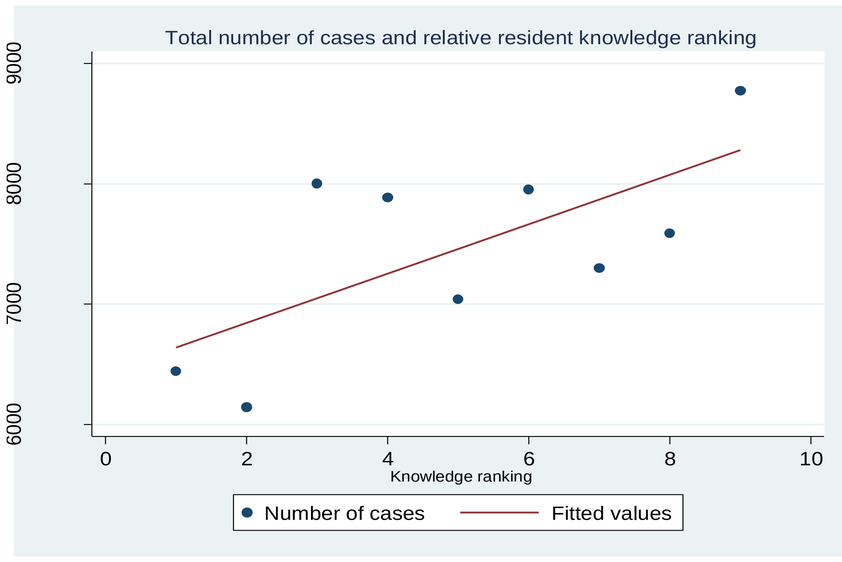

Figure 1. Plot of the total number of cases and the relative resident ranking of knowledge

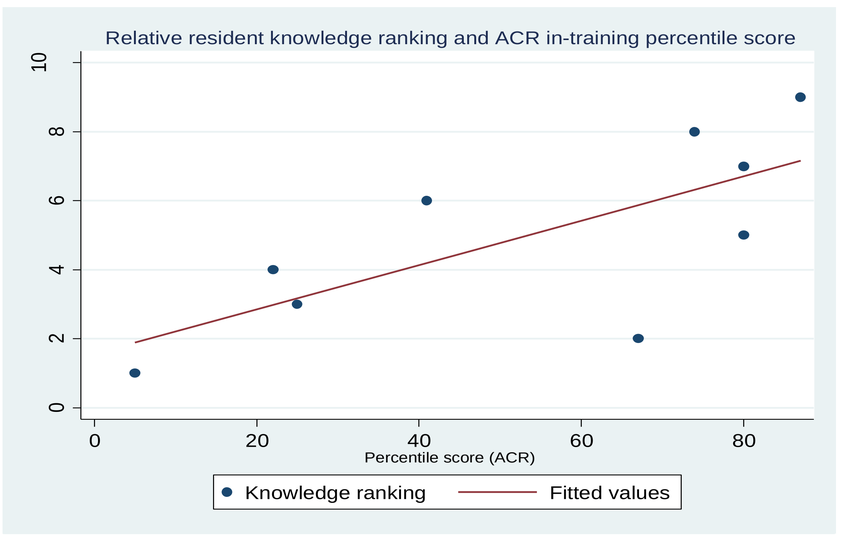

Figure 2. Plot of the relative resident knowledge ranking and the ACR in-training percentile

Conclusions

- This study reveals that residents who interpret more cases are more likely to demonstrate higher knowledge. This highlights the utility of case volumes as a prognostic marker of resident success.
- The results also underscore the potential use of ACGME minimum case volumes as a prognostic marker. These findings can inform future curriculum planning and development in radiology residency training programs.

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