Radiology research funding has increased—still no association with citation rate

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TABLE 1: Main Characteristics of Included Research Articles

Characteristic	Funded Research (*n* = 286)	Unfunded Research (*n* = 314)	*p*
Continent of origin of the first author			
Asia	95 (33.2)	78 (24.8)	0.024[a]
Australia	3 (1.0)	6 (1.9)	0.509
Europe	62 (21.7)	106 (33.8)	< 0.001[b]
North America	126 (44.1)	122 (38.9)	0.196
South America	0 (0)	2 (0.6)	0.500
Subspecialty			
Breast imaging	26 (9.1)	26 (8.3)	0.724
Cardiac imaging	17 (5.9)	8 (2.5)	0.038[a]
Contrast media	0 (0)	3 (1.0)	0.097
Experimental studies	14 (4.9)	4 (1.3)	0.014[a]
Gastrointestinal imaging	35 (12.2)	40 (12.7)	0.853
Genitourinary imaging	17 (5.9)	34 (10.8)	0.032[a]
Head and neck imaging	7 (2.5)	12 (3.8)	0.337
Health care policy and quality	7 (2.5)	9 (2.9)	0.751
Medical physics and technical developments	38 (13.3)	25 (8.0)	0.034[a]
Musculoskeletal imaging	19 (6.6)	35 (11.1)	0.054
Neuroradiology	40 (14.0)	29 (9.2)	0.069
Nuclear medicine and molecular imaging	16 (5.6)	6 (1.9)	0.016[a]
Pediatric imaging	9 (3.1)	22 (7.0)	0.033[a]
Special article	2 (0.7)	5 (1.6)	0.454
Thoracic imaging	26 (9.1)	18 (5.7)	0.115
Vascular and interventional radiology	13 (4.5)	38 (12.1)	< 0.001[b]
Journal			
AJR	58 (20.3)	142 (45.2)	< 0.001[b]
Radiology	128 (44.8)	72 (22.9)	< 0.001[b]
European Radiology	100 (35.0)	100 (31.8)	0.418
No. of authors, mean (range)	8.7 (2–31)	6.9 (1–17)	< 0.001[b]
Immediate open access publication	92 (32.2)	22 (7.0)	< 0.001[b]
Citation rate, mean (range)	13.4 (0–134.0)	11.8 (0–148.0)	0.166
No. of downloads, mean (range)[c]	1611 (216–12,384)	1687 (168–53,317)	0.011[b]

Note—Except where otherwise indicated, data are number (%) of research articles.
[a]Significance lost after adjustment for multiple testing using false-positive rate control.
[b]Statistically significant.
[c]Applies to *Radiology* and *European Radiology* articles only.

a. Significance lost after adjustment for multiple testing using false-positive rate control. b. Statistically significant.cApplies to Radiology and European Radiology articles only. Credit: American Roentgen Ray Society (ARRS), American Journal of Roentgenology (AJR)

According to ARRS' *American Journal of Roentgenology (AJR)*, nearly half (47.7%) of the research articles published in major radiology journals declared funding—a proportion that has increased from 17% of articles in 1994 and 26.9% published between 2001 and 2010.

"Most funded articles received support from federal sponsors or nonprofit foundations, whereas only a minority of funded articles were supported by private industry," explained first author Rayan H.M. Alkhawtani from the department of radiology, nuclear medicine, and molecular imaging at University Medical Center Groningen in The Netherlands.

And as Alkhawtani et al. concluded, "funding was not associated with a higher citation rate."

The Dutch team included a total of 600 consecutive original research articles published between January and October 2016 in three large journals: AJR, Radiology, and European Radiology. Using linear regression analysis to ascertain the association between research funding and citation rate, adjustments were made for the following seven factors:

- journal,
- continent of origin of first author,

- subspecialty,
- study findings included in article title,
- number of authors,
- immediate open access publication,
- time since publication online.

Finding that funding was declared in 286 of 600 (47.7%) included articles, the authors of this AJR "Original Research" article identified the six most significant funding sources:

- federal sponsorship (29.4%),
- nonprofit foundation (16.4%),
- both federal sponsorship and nonprofit foundation (16.1%),
- private industry (10.1%),
- intramural institutional research funding (9.8%),
- other combinations of funding sources (18.2%).

"Articles with first authors whose continent of origin was Europe (p

Meanwhile, the team noted that articles published in Radiology were significantly more frequently funded (p

Ultimately, citation rate was not significantly different between funded and unfunded articles (p = 0.166), and in the adjusted linear regression analysis, funding was not significantly associated with citation rate (β coefficient, -0.31; 95% CI, -3.27 to 2.66; p = 0.838).

More information: Rayan H. M. Alkhawtani et al, Funding of Radiology Research: Frequency and Association With Citation Rate, *American Journal of Roentgenology* (2020). DOI: 10.2214/AJR.20.22786

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