

General Anesthesia

Academic anesthesiologists' views on the importance of the impact factor of scientific journals: a North American and European survey

L'opinion des universitaires en anesthésiologie sur l'importance du facteur d'impact des revues scientifiques : une enquête nord-américaine et européenne

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Purpose: To investigate the views of North American and European anesthesiologists on the value of the impact factor (IF).

Method: Four hundred thirty-eight anesthesiologists in Canada, the United States of America (USA), and Europe were polled about the importance of the IF regarding hiring, promotions, funding of research and to express their personal views.

Results: IF of a candidate's publications is a criterion in 38% of academic appointments in Canada and USA vs 81% in Europe ($P < 0.0001$). The importance of IF to obtain funding is greater in Europe (46%) than in North America (17%) ($P < 0.0001$). Twenty-three percent and 50% of Canadian and American anesthesiologists respectively believe that IF affects financial support ($P = 0.0389$). European anesthesiologists value the IF more than the North Americans (67% vs 31%, $P < 0.0001$). Forty-five percent, 67%, and 56% of the Canadian, American and European anesthesiologists respectively estimate that IF reflects journal quality. Sixty-four percent of anesthesiologists in North America vs 81% in Europe ($P = 0.0175$) pursue to publish in high IF journals. Eighty-six percent, 85% and 90% of the Canadian, American and European anesthesiologists believe that the IF of a journal can be manipulated. Finally, 79%, 67%, and 81% of the Canadian, American, and European anesthesiologists believe that IF should be improved but 33%, 35%, and 30% believe that it should be abandoned.

Conclusions: IF for academic appointments and funding is more important in Europe than in North America. More than 50% of anesthesiologists agree that IF needs to be improved.

Objectif : Obtenir l'opinion des anesthésiologistes nord-américains et européens sur la valeur du facteur d'impact (FI).

Méthode : Quatre cent trente-huit anesthésiologistes du Canada, des États-Unis et d'Europe ont répondu à un sondage sur l'importance du FI en regard de l'embauche, des promotions, du financement de la recherche et de leurs opinions personnelles.

Résultats : Le FI des publications d'un candidat sert de critère dans 38 % des nominations au Canada et aux É-U vs 81 % en Europe ($P < 0,0001$). L'importance du FI pour l'obtention de financement est plus marquée en Europe (46 %) qu'en Amérique du Nord (17 %) ($P < 0,0001$). Vingt-trois pour cent et 50 % des anesthésiologistes canadiens et américains, respectivement, croient que le FI influence le soutien financier ($P = 0,0389$). Les anesthésiologistes européens accordent plus de valeur au FI que les nord-américains (67 % vs 31 %, $P < 0,0001$). Quarante-cinq pour cent, 67 % et 56 % des anesthésiologistes canadiens, américains et européens, respectivement, estiment que le FI reflète la qualité de la revue. Soixante-quatre pour cent des anesthésiologistes d'Amérique du Nord vs 81 % d'Europe ($P = 0,0175$) cherchent à publier dans des revues à FI important. Quarante-six pour cent, 85 % et 90 % des anesthésiologistes canadiens, américains et européens croient que le FI d'une revue peut être manipulée. Enfin, 79 %, 67 % et 81 % des anesthésiologistes canadiens, américains et européens pensent que le FI devrait être amélioré, mais 33 %, 35 % et 30 % voudraient qu'on l'abandonne.

Conclusions : Le FI est plus important en Europe qu'en Amérique du Nord quant aux nominations universitaires et au financement de la recherche. Plus de 50 % des anesthésiologistes pensent que le FI devrait être amélioré.

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THE impact factor (IF), the number of citations of a scientific journal divided by the number of articles published by the journal during the same two-year period,¹ has been a subject of controversy. Flaws like self-citations,² possible manipulation of the IF,³ bias in choosing cited article, influence of the scientific field, (basic research disciplines vs applied disciplines),⁴ lack of correlation between the IF of a journal and citation rate of a given article published in the same journal,⁵ and predominance of English language journals are the main arguments against the IF as we know it today.

Some have suggested the IF should be abandoned,⁵⁻⁷ several recommend its cautious application and improvement,^{2,4} but only few support it as the best operational measure.^{8,9} The editor of a journal may tend to adjust his/her policy so as to increase the journal's IF.⁸ However, most of the above mentioned publications are editorials or reviews and only very few provide data in favour of or against the importance of the IF.

In this study we sought the views of North American and European anesthesiologists on the IF by asking them to fill a questionnaire on the perceived importance of the IF for promotions, funding as well as on their personal views concerning its advantages, disadvantages and future.

Methods

Four hundred thirty-eight anesthesiologists, 33 in Canada, 193 in the United States of America (USA) and 212 in Europe were asked to express their view regarding the IF of scientific journals by answering a questionnaire. The survey recipients were all the American directors of accredited programs in anesthesiology, as well as all the department heads and program directors of the Canadian Universities, as obtained from the Director of the Canadian Anesthesiologists' Society (1999-2000). In Europe, survey recipients were recruited from academic departments in anesthesiology. As a source we used the Directory of members of the European Academy of Anesthesiology for the year 2000. The questionnaire was also sent to the Editors-in-Chief of the following anesthesia journals: *Acta Anaesthesiologica Scandinavica*, *Anaesthesia*, *Anesthesia and Analgesia*, *Anesthesiology*, *British Journal of Anaesthesia*, *Canadian Journal of Anesthesia*, *Clinical Journal of Anaesthesia*, *European Journal of Anaesthesiology* and *Regional Anesthesia and Pain Medicine*. The study took place from June 2000 until October 2000. The names of several responders were not always identifiable as many questionnaires were returned facsimile anonymously. Nonetheless, the

TABLE Number of questionnaires sent out, number and % of responses by country

Country	<i>n</i> questionnaires sent out	<i>n</i> questionnaires received	% of responses
Canada	33	22	67
USA	193	53	27
USA + Canada	226	75	33
Austria	12	15	125
France	20	14	70
Germany	56	35	62
Switzerland	10	7	70
United Kingdom	33	17	51
Belgium + Netherlands	20	9	45
Scandinavia (Denmark, Finland, Norway, Sweden)	20	13	65
Other (Bulgaria, Croatia, Czech, Hungary, Ireland, Israel, Italy, Poland, Portugal, Russia, Slovenia, Spain)	41	16	39
Europe total	212	126	59
Total	438	201	46

country of origin of the fax could be identified from the numerical code preceding the telephone number from which the facsimile was sent.

The first questions (part A) investigated the relationship between appointments and promotions and the IF of a candidate's publications, the second part (B) examined whether the IF may affect funding for research and the third part (C) examined the personal view of the anesthesiologist. Except for the questions regarding the advantages and disadvantages of the IF, which had, as is expected answers of descriptive nature, all the others could be answered by YES or NO.

Statistics

The positive answers (YES) for each individual question obtained from North American (Canada and USA) anesthesiologists were compared with those obtained from European anesthesiologists. Comparisons were made with χ^2 with Yates correction or with Fisher's exact test wherever appropriate.

Results

Appointments and promotions

The number of questionnaires sent out and the number and % of responses obtained from each country are shown in the Table. The number of responses obtained from Austria (15), higher than the number of questionnaires sent out (12), may be explained by the fact that some anesthesiologists wished to express their opinion despite not having received a questionnaire.

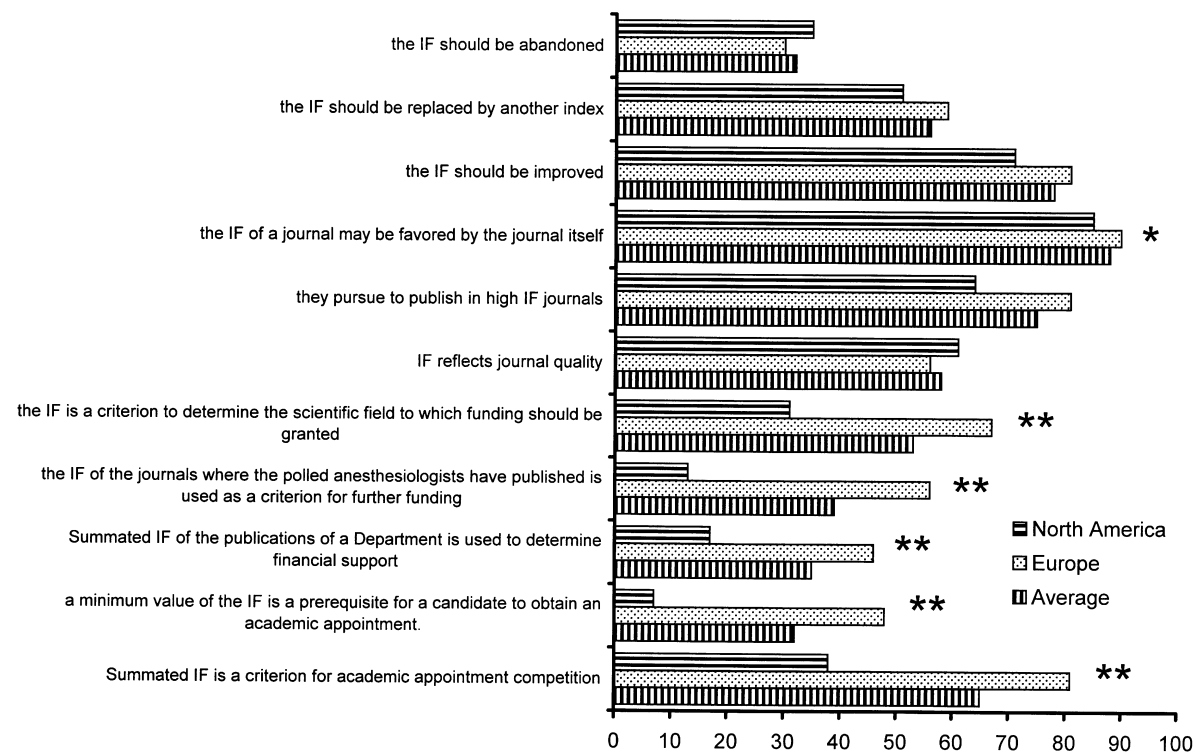


FIGURE The % of positive answers obtained from North America, Europe and overall average. * $P=0.0175$, ** $P=0.0001$, for comparisons between North America and Europe. IF refers to impact factor. Summated “IF” refers to the sum of the IF of the journals where an individual or a department has published its work.

The use of the IF as criterion for academic appointment differs significantly between North American and European anesthesiologists (38 *vs* 81%, $P < 0.0001$). Similarly, the requirements for a minimum IF of a candidate’s publications as a prerequisite for academic appointment is higher in Europe (48%) than in North America (7%; $P < 0.0001$; Figure).

Funding

The IF of publications of an Anesthetic Department as a criterion for financial support is similar in the USA and Canada (17% and 18% respectively) but higher in Europe (46%; $P < 0.0001$). Also, more institutions in Europe (56%) than in North America (13%; $P < 0.0001$) use the IF as a criterion for further funding. Finally, the importance of the IF to determine the research field where funding should be granted differs between Canada (50%) and the USA (23%; $P=0.038$) as well as between North America (31%) and Europe (67%; $P < 0.0001$; Figure).

Personal views

Forty-five percent of Canadian, 67% of American and 56% of European anesthesiologists estimate that IF reflects quality of a journal. Fifty-nine and 67% of Canadian and American anesthesiologists respectively pursue to publish in high IF journals, compared to European anesthesiologists (81%; $P=0.0175$). Eighty-six, 85% and 90% of the Canadian, American and European anesthesiologists respectively believe that a journal may positively influence its IF (Figure). Finally, 79%, 67% and 81% of Canadian, American and European anesthesiologists believe that the IF should be improved, while 70%, 42%, and 59% believe that it should be replaced by another index, and 33%, 35%, and 30% believe that it should be abandoned (Figure).

Some of the advantages of the IF commonly reported by North American and European anesthesiologists were: the IF is objective (12%), allows comparisons (18%), represents an index of quality (27%), enhances competition (4%), is easy to calculate and easy to use (4%), is widely accepted (10%), and is better than noth-

ing (4.5%). Some of the reported disadvantages were: the IF is biased (10%), is not a measure of quality (11%), lacks general recognition or general acceptance (0.5%), is self-perpetuating (7%), is subject to manipulation (7%), and favours English language journals (16%), specific scientific fields or specialties (24%).

Discussion

Appointments and promotions

The low response rate from American compared to Canadian and European anesthesiologists suggests either that Americans are less familiar with the IF or that it is less important in making rank and tenure decisions. Indeed, our results demonstrate that the importance of the IF for a scientist's appointment or promotion is much greater in Europe than in North America. We have chosen to question only anesthesiologists because, as anesthesiologists, we read and publish mostly in anesthesia journals which, in general, belong to the category of low IF journals. This may affect appointments and funding competition for anesthesiologists.

It is important to realize that a journal's IF does not represent the citation rate of individual articles. On the opposite, it is the article citation rate that determines the journal's IF. A journal has a high IF because it publishes articles with a high citation rate.¹⁰ Therefore, it might be more appropriate for individuals and research groups to be assessed primarily by the number of citations of their articles rather than by the IF of the journals where their work is published.

Funding

The same applies to some degree to departmental funding. Though it is generally believed that the IF is used to direct financial support for research,¹¹ our results show this may be true only to a limited extent in North America. The degree to which the IF will direct funding towards different scientific fields appears to be more important in Canada and in Europe than in the USA. Rapidly developing research fields will increase the IF and, most likely, receive more funding. Also, articles in basic science journals are frequently cited by clinical medicine journals but not vice versa. However, the inter-field IF differences can be normalized somewhat so that the differences are attenuated while the ranking of the different fields is maintained.

Personal views

We believe most anesthesiologists who answered the questionnaire were familiar with how the IF impacts appointments and funding. In their position as heads of

departments, program directors etc, they had been interviewed in the past on several occasions and, most likely, had participated in committees appointing anesthesiologists in academic departments. As researchers, they were also familiar with criteria for making funding decisions.

The view that the IF reflects journal quality is similar and widely accepted among anesthesiologists in North America and Europe. However, Europeans are much more eager to publish in high IF journals. In general, anesthesiologists believe that the IF of a journal may be favoured by policies of the journal itself. The editor of the journal "Leukemia" has been accused of asking the authors submitting a manuscript to include more articles published in "Leukemia" in their reference list.³

It has been shown that a high self-citation rate may positively influence the IF of the leading anesthesia journals. An appropriate correction by eliminating self-citations has been proposed.² However, although self-citations may affect the IF of some journals,² they do not determine the IF of high impact journals.

The most frequently reported advantages of the IF are that it is an indication of quality and allows comparisons between journals. Its most frequently reported disadvantages are that the IF favours English language journals, and that it is specialty specific and highly influenced by the scientific discipline. Despite its disadvantages and flaws^{2-7,11} only a relatively low percentage of North American and European Anesthesiologists believes that it should be abandoned. On the contrary, the majority believes that IF should be "kept alive" but needs to be improved.

Responses to our survey do not agree with published articles on the subject, the great majority of which are strongly opposed to the IF. Despite all the published limitations of the IF, high impact journals and their editors continue to attract the best manuscripts.¹² This is confirmed by the high percentage of North Americans and very high percentage of Europeans who answered that they seek to publish their work in high impact journals.

Our results suggest that the IF, although originating from the USA, is used more by Europeans despite its inherent limitations. Academic anesthesiologists believe that it should be improved upon or replaced by a better index. Until a "new and improved" index of quality of scientific journals becomes available, anesthesiologists should be well aware of the limitations of the IF, as we know it today.

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