

Improving standards in the scientific biomedical community in Romania by using journal ranking to improve journal quality*

Ioana Robu, Denisa Marineanu, Ileana Aciu & Sally Wood-Lamont, Central Library of the University of Medicine and Pharmacy, Cluj, Romania

Abstract

The paper articulates the problems of journal publication in a relatively small country such as Romania where locally (i.e. nationally) published journals include most of the national medical scientific output. The starting point was a study ordered by the Cluj University of Medicine and Pharmacy Scientific Council, for the purpose of obtaining an objectively ranked list of all current Romanian biomedical journals that could be used in the evaluation of the scientific activity of the university academic staff. Sixty-five current biomedical journals were identified—of which more than half were new titles that had appeared over the past 5 years. None of these are included in the *Science Citation Index* or *Journal Citation Reports (JCR)*. A set of criteria was used for ranking the journals: peer review, inclusion in international databases, publication time lag, language of articles and abstracts, journal specific index and domestic impact factor. The period covered, along with tools and formulas used are presented. The problems of Romanian biomedical journals as well as ways of improving publishing standards are discussed. Also emphasized is the necessity for increased awareness in the medical scholarly community and the role of the library in this respect.

Introduction

A healthy scientific environment is the prerequisite of scientific progress. There are mechanisms, expressed as standards and assessment tools, which are used to monitor, regulate and maintain a healthy state of scientific production. Most of these mechanisms have been devised in developed countries where there is high scientific output. How, or if, they apply to smaller, national environments, whether they should be complemented by other mechanisms in order to make them work, or whether the local scientific community may push

for change at the time when a critical mass is reached are all problems to be resolved at the level of the different countries.

The results of scientific research are communicated primarily through publication in journals. The evaluation of the quality of biomedical journals is as difficult as it is important. The importance of such an evaluation has increased in the past few years because (i) of the unprecedented rise in the number of journals (from 3000 in 1960 to over 40 000 at present)¹ primarily due to the growth of medical science,² and (ii) the continuing pressure of the members of the biomedical scientific community to publish or ... perish.³⁻⁵

At the international level the assessment of journal quality is based on the impact factor (IF), which was developed by the Institute of Scientific

Correspondence: Ioana Robu MSc, Director, Biblioteca Centrala U.M.F., 3400 Cluj-Napoca, Romania. E-mail: irobu@umfcluj.ro

*This is an edited version of a paper presented at the 8th International Congress on Medical Librarianship, London, 2-5 July 2000.

Information (ISI), and based on the *Science Citation Index* (SCI) database. The IF is a measure of the frequency with which an article in a journal has been cited in a particular year, i.e. a ratio between the number of current citations a journal receives in a specific year and the total number of articles published by that journal in the previous 2 years.⁶ The IF is used for various purposes, for example ranking journals by speciality or country, evaluating research at regional, national and even individual level. The use of the IF has prompted a critical reaction amongst scientists,^{7–13} some authors clearly stating it should not be used for evaluating research.⁷ That it only includes journals indexed in the SCI is recognized as a shortcoming. Journals published in smaller and/or developing countries, are largely omitted, and consequently the scientific communities in these places are left without a barometer for scientific activity, as is the case in Romania.

The interest in this problem is reflected by a number of studies, published mostly by researchers of non-English speaking countries, which have proposed methods of evaluation other than those based on the IF,^{14–19} or have addressed the issue of publication standards.²⁰

Initially this study was undertaken at the request of the Senate of the University of Medicine and Pharmacy in Cluj, Romania, in an attempt to establish some qualitative criteria for the evaluation of the list of published works of candidates for academic promotion.

Once the study was designed the objectives multiplied and the scope broadened. The aims also crystallized, namely to produce a set of valid and objective criteria of assessment of Romanian medical journals and indirectly of scientific output. This would also increase awareness in the Romanian medical community of the importance of standards in scientific communication as well as enhance the role of the library by adding a new dimension to its services.

Materials and methods

Of the 97 current serial publications included in the Catalogue of the Romanian National Library under the UDC classes of biology and medicine, 83 were included in the first phase of the study. The

remainder of the 14 titles represented newspapers and magazines, not scientific journals as such. Out of the 83, 16 were identified as belonging to the specific domains of pharmaceutical sciences (nine titles) and dentistry (seven titles). They were studied separately, in two different subsets, because one of the important criteria applied in this study, namely the domestic impact factor (see below), would have been irrelevant for the overall evaluation; these journals cited none of the other journals and were cited by none. Two journals were ‘comets’—they appeared and died within 1 and 2 years, respectively. The present study is based on 65 journals in the field of biomedicine, 25 comprising general and internal medicine and 40 different medical specialities. Only 24 journals were more than 10 years old, all the rest being new journals established after 1990. The mean age of the journals that appeared in the past 10 years was 5.5 years. None of the journals studied are included in the SCI. All the journals included in the study are held by our library. All the issues published over the last 3 complete years, i.e. 1997–1999 were investigated. In the case of missing issues or incomplete runs, we checked the cause with the publisher and gaps were filled.

A set of data, representing assessment criteria, was collected and introduced in the *Microsoft Excel* spreadsheet, and they were allocated a weight, expressed in percentages, according to their importance in the Romanian context (see Table 1).

Peer reviewing is generically used to designate a system by which a paper submitted for publication is examined by one or more referees that are specialists in the same field. It is a system that provides a certain validation of the data and research.

Table 1 Criteria and their values used in the study.

Criteria	Weight
Peer review	10
Inclusion in:	
MEDLINE	20
EMBASE	15
Other databases	10
Publication time lag	5
Journal specific index	5
Language of publication	10
Abstracts in other languages	5
Domestic impact factor	20

Our assessment was based on the statements included in the 'Instructions for Authors' or of the editors themselves. However, in view of the fact that the rejection rates are practically nil and the acceptance threshold is very low, the system having all the defects typical of small countries,²¹ namely the lack of a pool of reliable, interested reviewers and various biases, the importance and objective value of this criterion in the Romanian context decreases, therefore the weight allocated was only 10%.

Inclusion into international databases: MEDLINE confers a journal the highest visibility world-wide and it was one of the two criteria most valued (20%) in our study. Inclusion in EMBASE was weighted as 15%—less visibility than MEDLINE, mainly because of cost, and in other databases as 10%.

Publication time lag is one of the biggest problems of Romanian biomedical journals, principally due to financial constraints. When correlated with other major problems, such as the defective system of distribution and extremely feeble national bibliographic control, it results in the impossibility to know exactly whether a journal issue was published or not. The allocated weight was 5%, because we considered that a higher value, although justified, would be too drastic. The assessment was based on the existence of at least one issue published for year 1999 at the time of conclusion of this study, January 2000.

Journal specific index of authors and/or subjects is an objective criterion, included in our study because of its utility in the Romanian context, in which there is no database that indexes Romanian journals. It was allocated a weight of 5%.

Language of the journal and abstracts is another feature that confers more visibility of the journal abroad,⁵ and they were weighted with 10% and 5%, respectively.

The citation rate or *domestic impact factor* was calculated by dividing the total number of citations received by a journal with the total number of articles published. Citations were collected by examining all the references of the articles studied—source items. All the cited journals were counted, regardless of the date of the cited item (the oldest citation of a Romanian medical journal still current was from 1972). Along with inclusion in MEDLINE, this criterion received the highest value, 20%.

The value introduced in the spreadsheet at the time of data collection for all the criteria except the domestic impact factor was true or false, which was translated in the respective weight value in the results sheet. For example, a journal that had a true value for the criteria of peer reviewing (with allocated weight of 10) and specific index (allocated weight 5), and false or zero for all the rest, would have a final ranking coefficient of 15.0000. In the case of the domestic impact factor, the value calculated as shown above was introduced in the data sheet, and the highest value was considered as reference, being the only one appearing in the results sheet with the maximum allocated weight value of 20. The scores of all the other impact factors, which were included in the final ranking, were calculated based on the formula:

$$\text{IF score} = \text{IF} \times 20/\text{highest IF.}$$

The formulas were then applied to the whole spreadsheet and the final ranking coefficient was thus obtained for each journal, multiplied by 100 in order to avoid subunitary decimal numbers.

Other data were also collected, such as the number of articles by type—clinical trials, original research, reviews, progress in medicine, Romanian topics (epidemiological studies were also included here), case reports—but not included in the mathematical calculations because of the difficulty in allocating weights to each type objectively, with the exception of clinical trials, which would have probably received the highest value.

The following criteria for assessing journal quality were also considered for the study, but were excluded because they would not have been relevant, i.e. they did not influence the final results, would have introduced bias, or data could not be collected.

1 *Physical format:* paper (acid-free or not) and/or electronic. Only four journals were found to have a Website, which in all cases was reduced to the inactive table of contents; none of the 65 journals was published on acid-free paper.

2 *Number of copies published and/or number of subscriptions:* a measure for readership²² changes every year depending on the number of subscriptions and financial balance of the publisher. Figures are not willingly disclosed by the editors

Table 2 Final ranked list of Romanian biomedical journals.

Journal title	Ranking coefficient
1. Revue Roumaine de Medicine Interne/Romanian Journal of Internal Medicine	79.1509
2. Romanian Journal of Virology	76.1321
3. Chirurgia	75.0000
4. Romanian Journal of Neurology and Psychiatry	69.4340
5. Romanian Journal of Physiology	68.7736
6. Bacteriologia, Virusologia, Parazitologia, Epidemiologia	65.7547
7. Romanian Journal of Gastroenterology	61.0377
8. Oftalmologia	58.2075
9. Romanian Archives of Microbiology and Immunology	57.2642
10. Romanian Journal of Morphology and Embryology/Revue Roumaine de Morphologie et Embryologie	55.0000
11. Revista Medico-Chirurgicala Iasi	50.0000
12. Pneumoftiziologia	49.9057
13. Fiziologia Normala si Patologica—Normal and Pathological Physiology	47.6415
14. Romanian Journal of Legal Medicine	40.5660
15. Annals of Fundeni Hospital	40.0000
16. Romanian Journal of Gerontology and Geriatrics	36.5094
17. Paediatrica	36.2264
18. Romanian Journal of Endocrinology	36.1321
19. Clujul Medical	35.6604
20. Romanian Journal of Hand and Reconstructive Microsurgery	33.3962
21. Radioterapie si Oncologie Medicala	31.6981
22. Obstetrica si Ginecologia	31.2264
23. Jurnal de medicina preventiva	30.3774
24. Acta Phytotherapica Romanica	30.0000
25. Journal of Medicine and Biochemistry	27.4528
26. Oto-Rino Laringologia	27.1698
27. Romanian Biotechnological Letters	26.3208
28. Cercetari experimentale si medico-chirurgicale	25.9434
29. Applied Medical Informatics	25.0000
30. Revista de Ortopedie si Traumatologie	25.0000
31. Romanian Journal of Angiology and Vascular Surgery	25.0000
32. Dermato-venerologie	23.9623
33. Revista Medicala Nationala	22.0755
34. Timisoara Medicala	21.7925
35. Acta Medica Transilvanica	21.6981
36. Revista Romana de Anestezie Terapie Intensiva	21.5094
37. Romania Update	21.1321
38. Romanian Journal of Plastic Surgery	21.1321
39. Nefrologia	20.7547
40. Craiova Medicala	20.0000
41. Neurologia Medico-Chirurgicala	20.0000
42. Medicina moderna	19.3396
43. Sibiul Medical	18.3962
44. Revista Romana de Medicina Muncii	17.0755
45. Info-Medica	16.8868
46. Revista de medicina si farmacii Targu Mures	16.3208
47. Terapeutica	16.1321
48. Clinica	15.6604
49. Revista de Expertiza Medicala si Recuperare a Capacitatii de Munca	15.5660
50. Revista de Igiena si Sanatate Publica	15.5660
51. Jurnalul Roman de Patologie	15.3774
52. Revista Romana de Sanatate Mintala	15.3774
53. Acta Neurologica Transilvaniae	15.1887
54. Laborator Clinic—Tehnica Medicala	15.0000
55. Medical Update	15.0000
56. Revista Medicala Oradeana	15.0000
57. Revista Romana de Ultrasonografie	15.0000
58. Jurnalul de chirurgie toracica	10.5660
59. Revista Medicala Romana	10.5660
60. Quo vadis?	10.1887
61. Inima / The Heart	10.0000
62. Medicina Familiei	10.0000
63. Revista Spitalului Elias	10.0000
64. Spitalul	5.5660
65. Elita	5.0000

and therefore reliable data could not be collected. The estimated average is around 500 copies/issue.

3 *Use in the library* would have been a relevant parameter,^{23,24} but because it could only be monitored in our library, the initial findings indicated a marked use of the journals published locally.

4 *Interlibrary loan requests*. Because all Romanian medical libraries buy all medical journals published in the country, the rate of domestic request was insignificant. Requests from abroad were only two in the past year for journals in the 1997–1999 set, the foreign interest being for old Romanian medical journals published before 1940.

5 *Rate of article rejection*. Preliminary investigation into this matter revealed the fact that actually hardly any articles were really rejected, only postponed and/or sent back to the authors for modification.

Results

The final ranked list of the current Romanian biomedical journals is shown in Table 2. Rankings of the journals was also possible according to each criterion applied.

Peer review was found positive in 57 (87.6%) of the 65 journals.

Eleven journals were found to be included in the MEDLINE database, all of them belonging to the old generation, namely journals with a certain tradition, established before 1990. EMBASE only included eight Romanian titles, while 10 others were included in other specialized international databases.

The publication time lag was considered good or true if at least one issue had appeared in 1999 by the end of the year. Even so, more than half of the journals ($n = 39$) had no issue published in 1999.

Only 20 journals (30.76%) had an annual index published in the last issue of the volume/year, and among these only four had a subject index based on the keywords provided by the authors.

Nineteen journals (29.2%) were published entirely in English ($n = 18$) or French ($n = 1$), while 49 had abstracts in English. Three journals had abstracts both in Romanian and English. Fourteen journals were entirely published in

Romanian, with abstracts only in Romanian ($n = 8$), or no abstract at all ($n = 6$).

A very high rate of self-citations (calculated journal-by-journal not author-by-author) was found: average rate 44.39%.

The calculated domestic impact factor was over the unit only in the case of four journals (6.15%) of the total number of journals studied.

A total number of 5221 articles were processed. Regarding the types of articles, the great majority were 'original research' ($n = 3039$), followed by review articles ($n = 1029$), case presentations ($n = 439$), progress in medicine ($n = 408$), Romanian topics ($n = 280$). Clinical trials, as expected, represented the lowest number, 33.

Discussion

Providing the Cluj Medical University with a ranked list of journals based on a quantitative assessment was the initial aim of this study. However, of equal if not higher importance is the evidence of the numerous problems of the Romanian biomedical journals, which have been unveiled for the first time by the closer examination of the results obtained.

Examination of the top of the ranked list shows that all 11 Romanian biomedical journals indexed in MEDLINE are among the first 12 titles—the exception is the *Romanian Journal of Gastroenterology*, ranked #7. Their high score also resulted from the relatively high impact factor, but also because most of them were positive regarding peer reviewing, index and language. The MEDLINE journals represent the well established, traditional generation, accepted for inclusion in the 1970s and 1980s. Undoubtedly, they enjoy national prestige, and a recognized scientific worth—most authors are personalities in the field of Romanian medicine. They are also among the few journals with a nation-wide system of peer reviewing. However, all of them scored zero for the publication time lag, which was in some cases unacceptable: 2 or even 3 years. The number of the Romanian journals indexed in MEDLINE is similar to that of neighbouring countries (Hungary, Bulgaria, Slovakia, Croatia), but because of the low frequency and long time lags they do not compare well regarding the number of references. In the 1996–2000 subset of

Ovid MEDLINE, Romania had 846 references while Hungary (with the same number of journals) had 3050. The problems relating to the Romanian journals in MEDLINE makes it impossible to use the database as a basis for more elaborate bibliometric criteria of evaluation, such as the one proposed by Stegmann,¹⁸ or Barnaby and Gallagher.¹⁹ One of the positive effects in the long run of this study might be influencing the process of journal inclusion/exclusion in MEDLINE.

Examination of the 25 journals at the bottom of the ranked list shows scores between 5.0000 and 20.0000. Their score is composed of the positive time lag (found in 22 of the 25) and/or English abstracts, peer reviewing, and even a high impact factor. However, it should be mentioned here that an improvement of one or two criteria, such as for example a specific index and full text in English, would add 15 points and would push these journals 20 positions up in the hierarchy. This has already happened for a few journals following a preliminary report of the results given in front of the University Senate. Hopefully this will mark the start of a general process of improvement, for example by prompting the journal editors in the middle section of the list to take further steps to increase their own score in order to preserve their rank—by providing indexes, full text articles in English and seek inclusion in international databases. Those who will not be able to move forward might be naturally eliminated eventually.

The total citations count found in our study was 1428, which is extremely low in relation to the number of references to foreign sources. This reflects a situation which was known but never quantified; the extremely low impact at a national scale, due to several reasons: poor system of distribution and subscriptions, lack of a national biomedical database, lack of interest, poor scientific quality of the research or prejudice that quality will be poor if in a Romanian journal, and finally suspicion regarding the accuracy of reported data. The self-citation rate was found to be very high (mean 44.39%) as compared to the average citation rate in *Journal Citation Reports (JCR)*.²⁵ This may be partially explained by the fact that 40 journals (most of them with the highest self-citation rate) were specialized in the various biomedical fields,

which means only one to three journals per field, such as ophthalmology or ENT. It is natural that specialists should cite the journal of their speciality. High self-citation rates were also found for local journals, such as those published by a large academic centre.

A total number of 5221 articles were found and studied. Editorials, letters and comments were not counted. The harvest is poor, the calculated average per title being 80.3 over 3 years. This is because all but five journals have a frequency of four or even two issues/year, and very often the quarterly journals are condensed into only one or two issues. Differentiation by the types of articles was not easy, in most cases the standard defining features of a certain type was hard to identify. Most of them reported investigation of a certain number of cases (classed in our study as original research), or reports of one case. Reviews were the easiest to identify, followed by clinical trials.

The data found in this study also allow the calculation of the internal scientific output over the period studied, which is 254.3 articles/one million population. The external scientific output, calculated based on the 1996–2000 MEDLINE subset is 24.3 references/one million population. The figure is extremely low, even if compared with neighbouring countries, e.g. Hungary had an output calculated based on the 1990–1996 MEDLINE subset of ~100 references/million population;²⁶ this is also true of other small countries such as Switzerland, Denmark, Sweden or Israel²⁷. In the case of Hungary²⁶ the reasons behind the poor scientific output abroad are given as:

- no quality assessment of individual research,
- no promotion of research,
- poor motivation,
- no financial support.

These also apply in the case of Romania, where the aim is to achieve a minimal level of survival. However, in our case this attitude can be harmful to the environment as academics still require to have a certain number of articles published, and this puts pressure on the editors to publish low-quality articles and even establish new journals as a quick outlet for certain academics to publish a number of articles required for promotion, all these factors undermining the scientific environment of the country.

The roots of these problems are the financial constraints—even more developed countries have recognized that the economic level of a country is the first element to be taken into consideration²⁸ when referring to medical journal quality—and especially the vicious circle of inadequacy so well described by Marusic *et al.*²¹ in the case of journals in small countries.

This is the first study in Romania of this type and it is meant to reveal these problems and bring them to the attention of researchers and editors. If correlated with other studies by Romanian authors regarding the reporting and processing of data, authorship and ethical aspects of scientific publication,^{29,30} the picture is even gloomier. It is also the first step in the attempt to address these problems. A number of editors and medical academics involved in biomedical publication have already contacted the library and asked for advice regarding the improvement of their respective journals and how it might be possible to increase their ratings.

The next important measure will be the creation of a Romanian database for the health sciences. Its principles and design have already been established at the level of the Romanian medical libraries consortium. This will increase both internal and external visibility of the Romanian references, and will also influence the quality of journals by establishing strict rules for inclusion.

At first, solutions must be found to improve the internal standards, starting from the process of acceptance of manuscripts and their compliance with the uniform requirements.³¹ Comparisons with the rest of the world must follow, but we must bear in mind that the competition is ruthless, that information explosion constantly raises the standards of quality and accentuates the tendency to read a few of the highest-quality journals.³²

Electronic formats and Web publishing represent a democratizing factor and confer visibility,³³ but we agree with Bakker³⁴ that selection monitoring and tight standards will still be required, perhaps even more than for the paper form.

The fact that this study was requested and undertaken by the library is not incidental. It is the health library and the librarians' role to provide the quantitative and qualitative assessment tools, and this role must be assumed with full responsibility. Librarians should work together with their patrons, academics,

members of the health professions and editors to identify the problems of biomedical publishing, to increase awareness and educate journal editors who in turn will educate their authors.³⁵ By proposing solutions Librarians will make an essential contribution to the creation of a healthy scientific environment.

Conclusions

- 1 In order to achieve a healthy scientific environment in the field of biomedicine, the value of the primary sources, biomedical journals, must be constantly monitored.
- 2 Awareness should be increased in the scientific community regarding the importance of quality assessment tools and standards regarding publication.
- 3 Health sciences libraries must assume a new role as sentries of journal value in order to preserve a healthy scientific environment.

Acknowledgements

We would like to thank Csaba Giras and Valentin Robu for their technical assistance with this manuscript.

References

- 1 Verhoeven, A. A. H. *Information seeking by general practitioners*. PhD Thesis, Netherlands: Groningen University, 1999, pp. 1–5.
- 2 Swales, J. D. The growth of science and medicine; the opportunities and the obstacles. In: A. Querido (Coordinating Editor). *The Discipline of Medicine Emerging Concepts and Their Impact Upon Medical Research and Medical Education Proceedings of the Symposium Amsterdam 25–26 May 1993*. Holland: Elsevier Science, 1994: pp. 33–43.
- 3 Spala, M. An international comparison of publications from the staff of the First Medical Faculty of Charles University using the Science Citation Index and the 1991–1994 faculty bibliography. *Sbornik Lekarsky* 1996, **97**, 511–9.
- 4 Gjerde, C. Where are articles by candidates for academic promotion published? *Journal of Family Practice* 1992, **34**, 449–53.
- 5 Varro, V. Scientometry, impact factor, citation index: thoughts and considerations. *Orvosi Hetilap* 1996, **137**, 1558–9.
- 6 Garfield, E. Citation analysis as a tool in journal evaluation. *Science* 1972, **178**, 471–9.

- 7 Segden, P. O. Why the impact factor of journals should not be used for evaluating research. *British Medical Journal* 1997, **314**, 498–502.
- 8 Hansson, S. Impact factor as a misleading tool in evaluation of medical journals. *Lancet* 1995, **346**, 906.
- 9 Porta, M. The bibliographic 'impact factor' of the Institute for Scientific Information: how relevant is it really for public health journals? *Journal of Epidemiological Community Health* 1996, **50**, 606–10.
- 10 Golder, W. The impact factor: a critical analysis [Review]. *Fortschritte auf dem Gebiete der Rontgenstrahlen und der Neuen Bildgebenden Verfahren* 1998, **169**, 220–6.
- 11 Gensini, G. F. & Conti, A. A. The impact factor: a factor of impact or the impact of a (sole) factor? The limits of a bibliometric indicator as a candidate for an instrument to evaluate scientific production [Review]. *Annali Italiani di Medicina Interna* 1999, **14**, 130–3.
- 12 Pocard, M. The impact factor of medical journals: the judgement of Solomon or the dance of the 7 veils? *Annales de Chirurgie* 1998, **52**, 595–7.
- 13 Gallagher, E. J. & Barnaby, D. P. Evidence of methodologic bias in the derivation of the Science Citation Index impact factor. *Annals of Emergency Medicine* 1998, **31**, 83–6.
- 14 Maricic, S., Sorokin, B. & Papes, Z. Scientific communicability indicators in the periodicals in the Croatian Bibliography, Series B. *Informatologia* 1992, **24**, 109–28.
- 15 Maricic, S., Sorokin, B. & Papes, Z. Croatian journals at the end of the 20th century. *Druvena Istraivanja* 2000, **9**, 1–18.
- 16 Sawicki, W. Evaluation of research—reality and illusions. *Postepy Higieny i Medycyny Doswiadczalnej* 1998, **52**, 297–305.
- 17 Madai, A. & Holtl, W. Publications: good or bad? Critical appraisal of scientific publications. *Wiener Klinische Wochenschrift* 1998, **110**, 58–62.
- 18 Stegmann, J. Significance of journals not listed in the Journal Citation Reports (JCR). *8ICML Conference Proceedings*, London: [Web document] <<http://www.icml.org/confproc>>, 2000.
- 19 Barnaby, D. P. & Gallagher, E. J. Alternative to the Science Citation Index impact factor as an assessment of emergency medicine's scientific contributions. *Annals of Emergency Medicine* 1998, **31**, 78–82.
- 20 de Lemos, A. A. Infrastructure for biomedical literature: considerations on a number of Brazilian health journals. *Educacion Medica y Salud* 1981, **15**, 406–23.
- 21 Marusic, A. & Marusic, M. Small scientific journals from small countries: breaking from a vicious circle of inadequacy. *Croatian Medicine Journal* 1999, **40**, 508–14.
- 22 Fedorak, R. N. Assessment of medical journal quality. *Canadian Journal of Gastroenterology* 2000, **14**, 89–90.
- 23 Blecic, D. D. Measurements of journal use: an analysis of the correlations between three methods. *Bulletin of the Medical Library Association* 1999, **87**, 20–5.
- 24 Tsay, M. The relationship between journal use in a medical library and citation use. *Bulletin of the Medical Library Association* 1998, **86**, 31–9.
- 25 Institute for Scientific Information. *1993 Science Citation Index. Journal Citation Reports*. Philadelphia: ISI Inc, 1994.
- 26 Zallar, I., Hulesch, H., Hajagos, M., Samu, K. & Marton, J. Scientific publications from 10 central European countries in the leading foreign periodicals. *Orvosi Hetilap* 1997, **138**, 2855–61.
- 27 Kolbitsch, C., Balogh, D., Hauffe, H., Lockinger, A. & Benzer, A. National publication output in medical research. *Anesthesiologie, Intensivmedizin, Notfallmedizin, Schmerztherapie* 1999, **34**, 214–7.
- 28 Delgado Lopez-Cozar, E., Ruiz Perez, R. & Jimenez Contreras, E. Towards improving the Spanish scientific journals as means of scientific communication (editorial). *Anales de Medicina Interna* 1997, **14**, 381–3.
- 29 Toma, C., Bredeteian, O., Stanciu, V. V. & Stefanescu, C. An analysis of the articles published in *Revista Medico-Chirurgicala* over the last 7 years. *Revista Medico-Chirurgicala a Societatii Medicilor si Naturalistilor Iasi* 1995, **100**, 236–45.
- 30 Vidaeff, A. About authors and medical articles [Rom]. *Viata Medicala* 2000, **12**, 16.
- 31 International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *New England Journal of Medicine* 1997, **336**, 309–15.
- 32 Arndt, K. A. Information excess in medicine. Overview, relevance to dermatology, and strategies for coping. *Archives of Dermatology* 1992, **128**, 1249–56.
- 33 Germenis, A. E., Kokkinides, P. A. & Stavropoulos-Giokas, C. Non-indexed medical journals in the Web: new perspectives in the medical literature. *International Journal of Medical Informatics* 1997, **47**, 65–8.
- 34 Bakker, S. Automation of medical literature and information services. *Nederlands Tijdschrift voor Geneeskunde* 1997, **141**, 33–8.
- 35 Lundberg, G. D. Publication and promotion. Writing is all. *Lancet* 1998, **352**, 898.