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Changing trends in authorship patterns in the JPS: Publish or perish

András Pintér*

Department of Pediatrics, University for Paediatric Surgery, Medical Faculty of Pécs University, H-7623, Pécs, Hungary

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Abstract

Aim of Study: To examine changes in authorship patterns in the articles published in the Journal of Pediatric Surgery (JPS) over the last three decades (1981–2010), and to analyze why they took place.

Methods: Data for analysis were obtained from the JPS over three five-year periods (1981–1985, 1991–1995, and 2006–2010). All original papers (3740), case reports (884), and correspondence (236) were separately examined and analyzed. For investigation of percentage distribution of publications (original papers and case reports), combined groups of papers, with 1 to 3, 4 to 5, 6 to 9, and over nine authors were formed. Justified (ethical, acceptable) and unjustified (unethical, unacceptable) reasons for authorship changes were defined according to the International Ethical Guidelines. Comparisons among groups were made with Kruskal-Wallis tests, taking $p<0.05$ as significant.

Results: The number of authors of original papers and case reports increased significantly in consecutive periods ($p<0.001$). The same pattern was observed in letters ($p<0.01$). The percentage of papers with less than 3 authors significantly declined, whereas those with 4 to 5 authors did not change. Manuscripts with more than 6 authors significantly increased, and a similar pattern was seen in case reports.

Conclusions: This striking increase in the number of authors per article was evident in other medical journals as well, and reflects a progressive complexity in academic work along with the need for building resumes rich in publications. It can be anticipated that this tendency will continue in the future.

One of the most important requirements for advancement in clinical and academic careers is the authorship of scientific papers. Promotion, grant funding and professional or academic status are to a great extent dependent on ones publication record. Universities and clinical institutions are more likely to recruit and promote those with the thickest resumé, and the larger number of publications. The pressure to publish begins even before graduation. Hirther, et al., showed that those applicants who were accepted to paediatric surgical residencies in the US had, on average, more publications than those who were rejected (8.2 v. 4.2) [1]. Publication numbers are used not only for evaluation of an individual, but also for measurement of institutional performance [2].

Growing competition for training, academic appointments, and the increasing specialisation in medicine, generated a rapid increase in the number of publications per individual over the last three decades, and also in the number of authors per article [3]. This is not a new phenomenon. A study by Hoffmann, published in 1981, demonstrated a doubling in the number of authors per article in psychological

* Tel.: +36 72 535 967; fax: +36 72 535 971.
E-mail address: andras.pinter@aok.pte.hu.

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journals over a given period of time [4]. A survey of 2,800 scientific journals by the Institute for Scientific Information (ISI), from 1960–1980, revealed a remarkable increase in the number of authors per paper, from 1.67 to 2.58 [5]. The enormous number of papers published worldwide was estimated to be 1.3 million in 23,750 journals, in 2006 [6].

These changes in authorship patterns probably reflect parallel changes in publication policies, ethics, and even the publishing business. Since these changes involve the field of paediatric surgery as well, we undertook to investigate changes in authorship occurring in the Journal of Pediatric Surgery over the last three decades (1981–2010).

1. Material and methods

The study focused on the number of authors per manuscript, and the proportion of manuscripts with small, medium, and large number of authors. These variables were analyzed separately in original papers, case reports, and letters to the Editor.

The data were obtained from the Journal of Pediatric Surgery (JPS), published over three five-year periods (1981–1985, 1991–1995, and 2006–2010). In the first period (1981–1985), the JPS had only six issues per year, but that number increased to twelve issues per year beginning in 1986.

All original papers, case reports, and correspondence were separately examined and analyzed. Since it was occasionally difficult to distinguish between original papers and case reports, those articles appearing in the "Case Report" section of the JPS were considered as case reports. All other texts from the journal (obituaries, congress reports, abstracts, posters, book and historical reviews, honorary and invited lectures) were excluded from the study. These usually had only one author.

For investigation of the percentage distribution of publications (original papers and case reports) according to the number of authors per articles, papers with 1 to 3, 4 to 5, 6 to 9 and over 9 authors were combined into 3 groups. Articles with 1 to 3 authors were considered as papers with a low number of authors, those with 4 to 5 authors as papers with medium number, and articles with more than 6 authors were considered to have a high number of authors.

The preparation of this publication (collecting material, analysis and evaluation of data and writing the manuscript) with the exception of the statistical analysis, was done by the author.

1.1. Statistical methods

Changes in the number of authors in the three time periods studied were compared using non-parametric Kruskal-Wallis test for three or more samples. A $p<0.05$ value was considered significant. Statistical analysis was performed at the Biostatistical Department, Faculty of Health Sciences, University of Pécs, Hungary.

2. Results

Out of a total of 4584 articles, we distinguished 3740 original papers, 844 case reports and 236 correspondence letters during each of the three periods 1981–1985, 1991–1995, and 2006–2010.

2.1. Changes of number of authors per articles

The number of authors per article increased significantly for original papers, case reports, and correspondence. The increase in the number of authors in original papers and case reports was highly significant ($p<0.001$). The number of authors in letters also showed a significant increase ($p=0.01$) (Table 1).

2.2. Percentage distribution of articles according to the number of authors per article

Fig. 1 illustrates the percentage distribution of original papers according to the number of authors per paper in the three periods. Papers with a low number of authors declined over the 3 decades. The percentage of papers with a medium number of authors did not change significantly, but there was a large increase in the number of papers with a high number of authors. The percentage distribution of authors found in the case reports followed a pattern similar to that seen in the number of authors of original papers (Fig. 2).

Table 1 Statistical characteristics of number of authors per article according to the type publication from 1981–2010.

Period	N	Mean	Std.	Mode	Min.	Max.	K-W* Sign.
In original papers							
1981–1986	760	3.7	1.7	3	1	13	$p<0.001$
1991–1996	1405	4.4	1.9	4	1	15	
2006–2010	1575	5.3	2.3	5	1	15	
In case reports							
1981–1986	163	3.1	1.3	3	1	7	$p<0.001$
1991–1996	335	3.8	1.8	3	1	13	
2006–2010	346	4.5	2.0	4	1	13	
In correspondence							
1981–1986	36	1.9	1.5	1	1	7	$p=0.007$
1991–1996	92	2.0	1.5	1	1	9	
2006–2010	108	2.3	1.3	2	1	7	

N = Number of published articles.
* Kruskal-Wallis test.

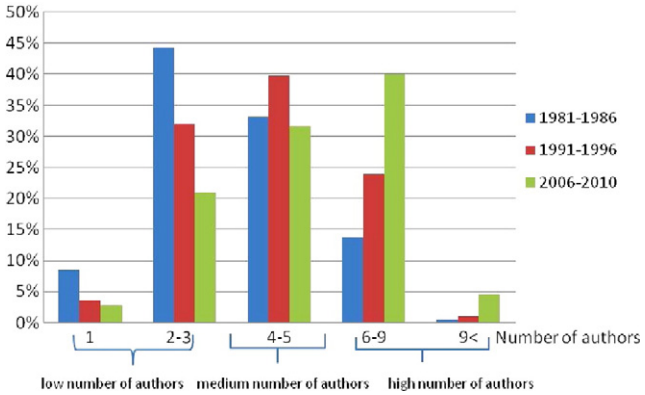

Fig. 1 Percentage distribution of original papers according to the number of authors per papers in the 3 periods.

2.3. Mean of number of authors per article type

Fig. 3 demonstrates that the average number of authors per article increased during the 30-year study period. This increase was particularly striking for original papers and case reports, where the mean increased from 3.7 to 5.4 and from 3.1 to 4.5, respectively (Fig. 3).

3. Discussion

Authorship is a very complex and confusing area of writing and publishing. Collecting material, analyzing, drafting, editing and producing a good manuscript are a highly labour-intensive and time-consuming process, which is often a collaborative effort between individuals with different training, credentials, and perspectives [7]. It is important to differentiate the writing of a document from its publication. The word "authorship" does not simply refer to the writing of the document.

In the present study, an attempt has been made to investigate how the number of authors per article published in the JPS has changed over the last 30 years (1981–2010). The increase in number of authors per article has been robust and

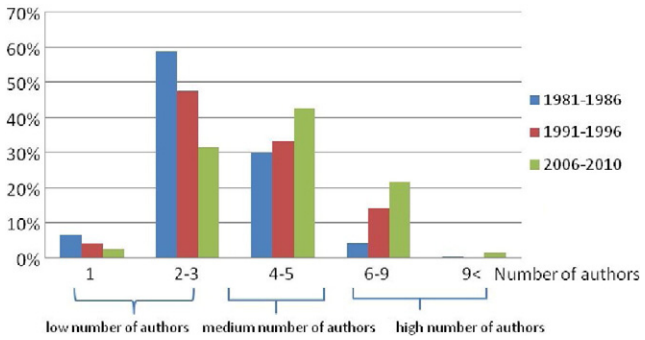

Fig. 2 Percentage distribution of case reports according to the number of authors per papers in the 3 periods.

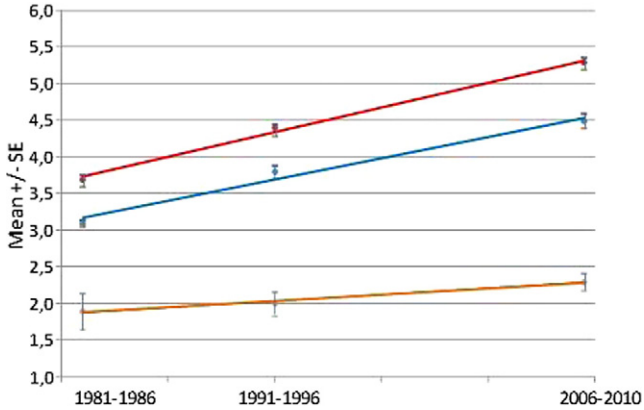

Fig. 3 Mean number of authors per article type in the 3 periods.

pervasive, particularly in the last five-year period (2006–2010). A highly significant and continuous increase was found in the number of authors per article in the first three article types (original papers, case reports and correspondence) investigated. These findings raise important questions regarding the cause of the changes affecting the process of establishing authorship, despite the clearly outlined and well-enforced regulation of the ethical and practical rules governing authorship.

Indeed, data suggest that number of authors per publication has increased during the past 20 years, yet the reasons behind this increase remain controversial [8–12]. Some non-surgical journals have made unsuccessful efforts to reduce the number of authors [13–15].

3.1. International Ethical Guidelines

The International Committee of Medical Journal Editors (ICMJE) states that authorship credit should based on [16,17]:

- substantial contributions to the conception and design, or acquisition of data, or analysis and interpretation of data.
- drafting the article or revising it critically for important intellectual content.
- final approval of the version to be published.

All three conditions must be met. Acquisition of funding, collection of data and general supervision of the working group do not justify authorship.

In 2006, the JPS also published a "Consensus Statement on Surgery Journal Authorship 2006", which was accepted by the editors of the 29 best-known surgical journals. This statement was intended to provide an ethical guideline for authors of these journals, when preparing and submitting a paper for publication [18]. In 2010, the members of the Surgery Journal Editors Group agreed to adapt the guidelines established by the Committee on Publication Ethics (COPE) [19]. These rules and guidelines, although unanimously accepted, are often breached, and therefore it is sometimes difficult to know who did the actual work.

3.2. Number and order of authors

The guidelines outlining the requirements for authorship do not regulate the number and order of authors. It is generally accepted that the best position is the first authorship, which is sequentially followed in rank until the last authorship. The first named authors usually have made the greatest contribution to the work. The last place is often given to the senior team member for his/her expertise and guidance.

What about those in the middle? Recently, an article with 13 authors from one unit was published in the JPS [20]. How is it possible to distinguish the 2nd from the 12th author's contribution to the preparation of the publication? How is it possible to compare someone who has published only 10 or 15 papers, and always as the first or last author with someone who has hundreds of publications, but has never appeared as a first or last author [21]? In this age of multidisciplinary work, there are papers with an enormous number of authors. It is often difficult or impossible to know who has contributed and to what degree because there are no written ethical rules about the number of authors appearing on a paper.

3.3. Group authorship

Group authorship also makes it difficult to determine the question of authorship. Some journals permit the use of only the group name [22], but many require the names of the writing group to be listed in the footnotes [16,23].

3.4. Citation index and impact factor

The citation index was born out of a necessity to find a way to evaluate clinicians, other than their number of publications. The citation index is the number of times a paper has been cited over a certain period. However, it is not the most effective system because those publications that are listed on the Institute of Scientific Information (ISI) from the United States are practically all included [21]. Those papers that originate in developing areas are undercited. Many papers which are not published in English, are often not cited at all [23]. Impact Factor (IF) is another tool that may be used to assess a publication. It describes the number of times the journal in which one publishes is cited by others.

3.5. Acceptable causes of an increased number of authors per article

An important question raised by my findings is why this remarkable increase occurred in the number of authors per article.

There are both justified (ethical, acceptable) and unjustified (unethical, unacceptable) reasons responsible for the increased of number of authors per article.

3.5.1. Pressure to publish

The main reason for the increase in the number of authors per article is most likely the enormous pressure to publish. Our professional value is often measured by the number of peer-reviewed publications we have, by the impact factor of the journal we publish in, and by the number of citations given for our work [24,25]. Not long ago, Imperial College's medicine department was told that their productivity target for publication was to "publish three papers per annum including one in a prestigious journal with an impact factor of at least five" [6]. Periodicals of the smaller specialities, including the paediatric surgical journals (with the exception of Seminars of Pediatric Surgery), have lower IF than the journals of larger specialities (J Urol, Surgery, J Pediatrics, etc.).

We have to realize that we are living in a "publish or perish" culture, in which our promotion and scientific career rely on our publication activity. Most papers, even poor-quality papers will eventually be published, either in a journal with low IF or in a peer-reviewed periodical without IF.

Most universities make it clear that impact factors, citation rates, and other bibliometric information should be provided during the application process. Many candidates under this pressure sometimes fall prey to double publishing, self-plagiarism, or submitting the "minimal publishable unit" of their work [21].

3.5.2. Explosion of professional knowledge

Another explanation for the remarkable increase in the number of authors per article is the scientific and professional knowledge explosion occurring over the last two or three decades. It has resulted in greater and more complex theoretical and practical research requiring more experts with a variety of knowledge. The only way that this increase in demand can be fulfilled, is to utilize a wide-array of experts who are then justifiably listed as authors. It is recognized that their contribution to the work is indispensable and necessary for producing relevant and applicable results.

3.5.3. Multi-institutional and multinational papers

Infrequent paediatric surgical conditions can be collected and analyzed through a multi-institutional or multinational collaborative study, which also justifiably increases the number of authors per article.

3.5.4. Globalization of scientific communication

Another justified and acceptable reason for the increase in the number of authors per article is the globalization and the rapid development of information and scientific communication. Those papers that are internationally co-authored are more likely to be accepted for publication, and also result in higher citation rates, when compared with domestic or national publications [25].

3.6. Unacceptable (unethical) increase of number of authors per article

Besides the above-mentioned justified and/or acceptable reasons for the increase of number of authors per article, there are several unethical and unacceptable reasons for expanding the definition of authorship.

3.6.1. Exchange courtesy

The most frequent trick used to increase the number of papers attributed to an author is for colleagues to exchange courtesy. One colleague puts another's name on his/her paper, and in return is guaranteed authorship in any of this colleague's future publications. This courtesy can be extended to include multiple colleagues, extending authorship to multiple papers [21].

3.6.2. Gift authorship

Gift authorship describes inclusion of names of people as authors who take little or no part in the work. These are often senior figures (e.g. head of the department) whose name is added as a gesture (or as an expectation). Sponsoring companies might ask for the inclusion of members of their team who made virtually no contribution to the study.

3.6.3. Ghost authors

This practice usually refers to a professional writer or a well known expert, whose role in the preparation of the manuscript is not acknowledged. Although such writers rarely meet the International Committee of Medical Journal Editors (ICMJE) criteria [17], since they are not involved in the design of studies, or in the collection and interpretation of data, their names lend credence to the paper's content [26]. The expert will also benefit from the increase in number of papers published.

3.6.4. Fragmentation

Another way to increase the number of papers produced (as well as authorship, impact factor, and citation rate) is to publish incomplete articles. By dividing them into fragments, one paper may appear as multiple separate publications. This is the "minimal publishing unit" policy [21]. Reviewers should ensure material submitted for publication is not just a selection of a few points, or the so-called salami slicing of work.

3.6.5. Double publication

Double publication is to re-publish the same set of data (or only the relevant part) from an article that has already been published or is being published.

3.6.6. Plagiarism

Plagiarism means a phrase, paragraph, or an idea has been copied from someone else's work, without stating its source and presenting it as one's own. Self-plagiarism is a form of plagiarism in which the author repeats his or her own work, and neglects to cite the source, thereby presenting the repeated information as novel.

3.7. Limitations of the study

In a few collaborative national or international studies with many contributors, estimation of the exact number of authors per article was difficult or impossible, because only the name of the study group was given. The names of the writing committee appeared only in the footnote, or not at all. This occurred mainly in the publications of well established oncological study groups. These few articles in which establishing authorship was difficult only minimally influenced the final results extracted from the evaluation of the 4820 publications that were analyzed.

The evaluation of the number of authors per article should take into consideration that, between the first (1981–1985) and second (1991–1995) periods examined, there was a 5 year interval. However, between the second (1991–1995) and the third (2006–2010) periods, there was a 10 year interval.

Sometimes it was difficult to distinguish between original papers and case reports. However, it probably did not modify the results, because similar tendencies occurred in both groups of publications during the 30-year period examined.

A further deficit of the present investigation is that drawing samples for investigation did not occur randomly, but this defect is well compensated for by the fact that the analysis extended to 50 percent of all original papers, case reports and correspondence published in the JPS during the investigated 30-year study period.

The author is aware of the fact that the character of the study makes it difficult, almost impossible, to interpret the available data regarding the causes of the changing trends in the authorship pattern in the JPS.

4. Conclusions

There has been a robust and pervasive increase in the number of authors per article in the JPS. This is not a new phenomenon, and can be explained by both acceptable (justified, ethical), and unacceptable (unjustified, unethical) reasons. Extrapolation of the findings of this study suggests that there will be a further increase in the number of authors per article in the Journal of Pediatric Surgery in the future. Factors leading to a continuous increase in the number of authors per article are probably characteristic of most other medical journals.

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