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# **Academic Advancement of Authors Receiving Tutoring from a Medical Journal**

**Short title:** Journal Editors as Medical Teachers

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## **Abstract**

**Background:** Although publishing in scientific journals has an educational component, the educational role of journals in medicine has not been evaluated.

**Purpose:** To assess whether tutoring authors in a medical scientific journal could be related to their long-term scientific publications and academic advancement.

**Methods:** The study included 47 journal authors who were individually tutored in scientific writing and data presentation by the editors of the *Croatian Medical Journal* during 1991-1995 war years and 47 colleagues whom the authors identified as their academic peers at the time of tutoring. We assessed their published articles in scientific journals, citations to these articles, and academic advancement, defined as the level of postgraduate education and advancement in the academic rank.

**Results:** By 2003, tutored authors published more articles in MEDLINE-indexed journals than their academic peers (median 4, interquartile range 1-9 vs. 1 [0-5], respectively;  $P=0.0265$ ), and received more citations to these articles (4 [0-16] vs. 1 [0-6],  $P=0.0275$ ). They also made a significantly greater academic advancement, assessed as a score of their academic rank and research degree (2 [0-4] vs. 1 [0-2],  $p=0.0369$ ).

**Conclusions:** Editorial tutoring of journal authors can positively influence their long-term academic advancement. Journals may have an important teaching role in local academic communities.

**Key words:** academic advancement, journal editor, medical journal, publication, scientific writing, tutoring

## Introduction

Scientific journals have a significant impact on two parts of the academic medicine triad:<sup>1</sup> journal publications bring rewards for research and improve health care. Journals' relation to medical teaching is less obvious and researched, although journals are a tool for virtual education: they publish educational articles or provide guidelines on scientific writing.<sup>2,3</sup> Scientific journals are often used as a tool for developing critical appraisal and writing skills in an academic setting,<sup>4-6</sup> and some influence the academic community indirectly, e.g. by teaching peer review.<sup>7,8</sup>

The virtual nature of the communication between the journal/editor and author does not allow methodologically rigorous assessment of educational impact of scientific journals on academic medicine. We had the opportunity as the editors of a small general medical journal, the *Croatian Medical Journal (CMJ)*, to work directly with our authors, teaching them the principles of research methodology and skills of data presentation and writing.<sup>9-10</sup> To determine if this tutoring could in any way be related to the academic career of our authors, we compared their academic advancement and research publications with that of their academic peers from the same institutions.

## Method

During the 1991-1995 war years in Croatia, *CMJ* editors worked closely with 65 authors on the articles they wrote about the medical impact of war for the *CMJ* (n=50) or other international journals (n=15). They came to our office after the invitation we sent to physicians working in institutions directly affected by the war. The authors received individual tutoring on research methodology, writing and data presentation in a scientific article. The tutoring was not formally structured but included the following educational activities: 1) joint critical reading of the author's manuscript, 2) discussion of the weak points of the study design and data presentation, 3) written instruction to authors for further work on their manuscripts until the next tutorial meeting, and 4) provision of relevant educational information on scientific writing, including the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (available at [www.icmje.org](http://www.icmje.org)), guidelines for the presentation of data, and copies of articles on scientific writing or chapters from textbooks on data presentation and writing. Most of the tutored authors (n=25) came from Zagreb, the capital of Croatia, and the rest from 14 other Croatian cities. Their articles were published in 1992 (n=36), 1993 (n=6), 1994 (n=8), 1995 (n=13), and 1996 (n=2).

We wrote to all 65 tutored authors in December 2002, and asked them to send their *curriculum vitae* and bibliography. They were also asked to name two colleagues from their institution, who were of the same sex and similar age, professional field, and academic status in the year when they received editorial tutoring. Co-authors on the “tutored” article were not eligible for these peers. After two reminders, the response rate was 72.3% (n=47, 37 men and 10 women); 2 authors refused to participate and 16 never replied.

We then wrote to 94 academic peers identified by tutored authors, asking them for the same data as the tutored authors. The response rate after up to 5 written reminders was 60% (n=56). When the response was received from both peers (n=9), the person judged by all investigators to be academically more advanced was selected as a control. When a single response from a pair of peers was received, only the respondent was included in the study. The reminders were sent to both members of the peer pair until one of them responded. The final study sample included 47 tutored authors and their 47 controls, matched peer by peer.

We counted the number of publications before the time of publication of the “tutored” article (1992-1996) and again at the end of 2003. The “tutored” article was excluded from analysis.

Eligible publications included original research papers, reviews, and research letters.

Domestic journals included all journals published in Croatia, regardless of their language (Croatian or English) or target readership (Croatian or international). Articles in journals indexed in MEDLINE/PubMed were retrieved by searching the database using the name of each participant as a key word. Citations to respondents’ articles included in the study were retrieved from the *Web of Science* database of the Thomson Institute for Scientific Information (ISI), Philadelphia, PA, USA.

Academic advancement was assessed as the level of postgraduate education and the advancement in the academic rank. Academic rank was classified into 6 categories: 1) no academic status, 2) instructor, 3) senior instructor, 4) assistant professor, 5) associate professor, and 6) full professor. The postgraduate education, which is mandatory in Croatia for all academic positions, was classified into 4 categories: 1) none, 2) attending postgraduate program after the MD degree, 3) Master of Science degree, 4) and Doctorate of Science degree. Each level in the two categories was counted as a single point, and the academic advancement was calculated as the difference between the points at the end of 2003 and at the time of “tutored” article publication.

As the data were not normally distributed, we presented them as the median and interquartile range. Data were compared with Wilcoxon independent test, using the SPSS v7.5 (SPSS, Inc., Chicago, IL).

## **Results**

At the time of tutoring, authors and their self-matched colleagues were of a similar academic status: they had not yet obtained any academic title (22/47 authors and 28/47 controls) or were instructors (14/47 authors and 11/47 controls). Most of them had either a masters or doctoral degree (32/47 authors and 25/47 controls). Before tutoring, tutored authors published more publications in domestic journals (median=6, interquartile range=3.3-12.8 vs. 3 [1.0-9.8]; P=0.0068) and in those indexed in MEDLINE (1 [0-4.8] vs. 0 [0-2.0], P=0.0254), and received more citations to their publications (0 [0-8.8] vs. 0 [0-1.0], P=0.0211) than their untutored peers.

Follow up after the tutoring by journal editors showed that tutored authors kept on publishing more articles and, additionally, made a greater advancement in the academic career than their academic peers (Table 1). The two groups did not differ in the number of newly published articles in domestic journals, but authors receiving tutoring published significantly more articles in MEDLINE-indexed journals. Their publications were also more visible in the mainstream science as they received more citations to their publications than their untutored peers (Table 1).

## **Discussion**

This study showed that editorial assistance to inexperienced authors, in the form of direct tutoring in study design, data presentation, and writing, may be related to their subsequent academic advancement. In comparison to the academic peers they identified in their institutions, they published more scientific articles in MEDLINE-indexed journals, got more citations for those articles and reached higher academic ranks.

Although the design of this historical cohort study did not allow direct establishment of causative relationships between editorial tutoring and authors' academic advancement, it showed several important results: 1) that authors are interested in learning about the specificities of data presentation and publication, 2) those who accept editor's invitation for tutoring already have a better publication record than the colleagues they identified as their academic peers at the time of editorial tutoring, and 3) such authors then produce more publications after tutoring and advance faster academically than their non-tutored colleagues. Before tutoring, the tutored authors had more journal publications and citations than the colleagues they identified as their peers in the institution. During the recruitment for the study

we asked tutored *CMJ* authors to send us the names of the colleagues from their institution who were of the same age and gender and had the same academic (postgraduate training and faculty or research title) or professional status (field of medicine, status at the department, clinic or hospital). We did not specifically ask them to match their peers in number of publications, and the authors were not aware of the variables included in our analysis. We believe that such selection method identified appropriate control cases for the tutored authors. The validity of the control group in our study is supported by the comparability of self-identified peers of tutored authors in their publication practices with the teaching staff from the largest and oldest medical school in Croatia.<sup>11</sup> According to the study of 5 years of publication productivity in the Zagreb University School of Medicine,<sup>11</sup> 45% of Zagreb junior academic staff did not publish any articles in journals indexed in ISI databases. This compares well with 43% of self-identified peers without articles in such journals in the same time period (1995-1999). Moreover, the percentage of control cases without publications in our study falls in the range from 25% to 67% of professors from the same school who also did not publish an article in ISI-indexed journals during the same time.

As we always selected individuals who had more publications or higher academic or professional status during the selection of peer controls, the resulting difference in the number of publications between the tutored and control groups could be explained by greater interest for research and academic medicine on the part of the tutored authors even before they received such tutoring. The invitation to publish about their professional experiences had been sent to the individuals but to the institution during the war, so that the tutored authors may have come to our office because they already had some knowledge and experience in or interest for research. We believe that tutoring by journal editors enabled them to increase their knowledge and skills in writing needed for presenting their research to the international scientific community. This is clearly indicated by the fact that in 2003, 8 to 12 years after work with the journal editors, tutored authors had more publications in internationally visible journals but not in domestic journals as their non-tutored peers.

Many of our tutored authors were also part of the general change the war had on medical education in Croatia. The primary experience of medical academics, and physicians in general, during the war was that of learning.<sup>10,12</sup> Croatia had no personnel, equipment, education or institutions dedicated to war and military medicine before the war. This was particularly acute in surgery and psychiatry, but knowledge had to be gained along with the care for many patients, as an impressive example of self-directed learning.<sup>10</sup> Most of our tutored authors were from the fields of surgery, anesthesiology, psychiatry, and public health,



and their publication in the Croatian Medical Journal and other international journals greatly contributed to the advancement in war-related medicine.<sup>13</sup>

In conclusion, our study emphasizes the role of a scientific journal and its editors as educators in a small medical academic and scientific community.<sup>14,15</sup> For us at the *Croatian Medical Journal*, the experience of working with the authors taught us how necessary and needed was education in research methodology and critical assessment of data and literature in our small medical and scientific community.<sup>16</sup> In addition to the knowledge of English, as the main language of scientific communication, all our tutored authors shared the same problems with the presentation of results, specific scientific discourse, and manuscript organization.<sup>17</sup> During our work with them as editors-tutors, we focused, at different times and with different intensity, on four main, tightly intertwined layers of a manuscript: the study itself; the narrative (IMRaD format); the scientific reporting style; and the language.<sup>16,17</sup> What we learned from working with our authors prompted us to introduce these topics in the medical curriculum at all four universities in Croatia, so that we now teach principles of scientific research as a mandatory course to medical students.<sup>6</sup> Our experience from a small academic community shows that one of the most important roles of journal editors, usually active and respected academics themselves, is that of educators,<sup>14</sup> especially for their young and motivated authors.

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**Table 1.** Scientific publication and academic advancement of authors 8 to 12 years after receiving editorial tutoring, compared with their academic peers

Academic category	New publications or academic advancement (median, interquartile range)	
	Tutored authors (n=47)	Academic peers (n=47)
Publications <sup>a</sup> :		
Total journal articles	11 (5.0 – 17.6)	9 (4.3 – 15.8)
Domestic journals <sup>b</sup>	5 (2.0 – 10.0)	5 (1.0 – 10.0)
Non-domestic journals	4 (1.0 – 10.0)	2 (0 – 5.0)
Journals indexed in MEDLINE <sup>c</sup>	4 (1.0 – 9.0)*	1 (0 – 5.0)
No. of citations to published articles <sup>d</sup>	4 (0 – 16.0)*	1 (0 – 6.0)
Academic advancement <sup>e</sup>	2 (0 – 3.7)*	1 (0 – 2.0)

<sup>a</sup>The category of journal articles included original research papers, reviews, and research letters. Newly published articles were calculated as the difference between the number published at the time of the tutoring (1991-1995) and end of 2003 (excluding the article for which tutoring was received).

<sup>b</sup>Domestic journals included all journals published in Croatia, regardless of the language and nature of publication; the *Croatian Medical Journal* was included in this group.

<sup>c</sup>Bibliographic database of the National Library of Medicine, Bethesda, MD, USA.

<sup>d</sup>Citations were retrieved from the Web of Science database of the Thomson Institute for Scientific Information (ISI), Philadelphia, PA, USA.

<sup>e</sup>Composite score, awarding a point for each of the 6 academic ranks (from none to full professor) and each of the 4 academic education levels (from none to PhD in medical sciences) available at Croatian universities.

\*Statistically significant difference between tutored authors and controls,  $P \leq 0.0369$  (Wilcoxon independent test).