Titles of Articles in Peer-Reviewed Journals Lack Information on Study Design: A Structured Review of Contributions to Four Leading Medical Journals, 1995 and 2001

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In November 2003, the International Committee of Medical Journal Editors (ICMJE) published new guidelines that included the following statement: "Concise titles are easier to read than long, convoluted ones. Titles that are too short may, however, lack important information, such as study design."[1] Few journals provide authors with guidance about the recommended content of titles; one notable exception is the *BMJ*, which advises contributors that the title should include "the study design if the paper presents original research".[2]

We have described previously a method for classifying article titles according to the kind of information they contain: methods, results, conclusion, specified dataset, or topic only.[3] We found that 40% of titles from 420 original research articles published from July through December 1995 in four peer-reviewed medical journals—the *BMJ*, *JAMA*, *The Lancet*, and the *New England Journal of Medicine (NEMJ)*—contain information only about the study topic (range among the four journals, 35% to 48%). Titles that reflect only the topic of a study may prevent potential readers from grasping what new, different, or special information is contained, whereas titles that contain additional information—in particular, information about study methods and design—can help readers to judge at a glance their level of interest in a given article. We report here the information content of titles of articles in the *BMJ*, *JAMA*, *Lancet*, and *NEJM* in July through December 2001 and compare these results with those obtained for titles in the same journals in July through December 1995.[3]

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The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Methods

We examined the titles of 417 original research articles published in the print issues of the *BMJ*, *JAMA*, *Lancet*, and *NEJM* in July through December 2001. We restricted our study to articles that could be considered as original contributions (*BMJ*, "papers"; *JAMA*, "original contributions"; *Lancet*, "articles"; and *NEJM*, "original articles"); articles labeled as brief reports within these sections were excluded. Titles were classified according to the following typology:[3]

Topic only: Title included a subject but failed to meet criteria of other categories listed below or seemed ambiguous.

Methods/design: Title specified the topic and an approach to study design, data management, or analysis (for example, case-control, cohort, effectiveness, efficacy, frequency, incidence, mortality, prevalence, surveillance, survival, trend, or validity study; meta-analysis; randomized clinical trial; or sensitivity/specificity or cost-effectiveness analysis); title indicated an investigation of an epidemic or outbreak; or title provided an incomplete description of a method (for example, assessment, evaluation, population sample, comparison, or suggested comparison).

Dataset: Title listed the topic and name or acronym of a specific study.

Results: Title contained the topic and quantitative information (a specific value) or semiquantitative or ordinal information (such as increased, decreased, high, or low) or some other specification of a relation (such as association, change, correlation, determinants, effect, evidence, impact, influence, outcomes, predictors, relation, remission, risk, variability, or variation) regarding what the authors found.

Conclusions: Title included the topic and an unequivocal statement based on the analysis of the reported evidence.

We reviewed and classified each of the titles independently with the above typology and then resolved disagreements through discussion.

To evaluate statistically significant changes in the content of article titles from 1995 to 2001, we performed a chi-square test of independence within each journal and across all journal and title categories. We did not perform the chi-square test for cells with an expected count less than five; these included the "dataset" category

Table. Distribution of Titles, by Category, in Articles Published During July—December 1995 and 2001

	Journal														
	BMJ			*JAMA*			*Lancet*			*NEJM*			Total		
	1995 (%) (n = 133)	2001 (%) (n = 112)	*P* Value	1995 (%) (n = 73)	2001 (%) (n = 95)	*P* Value	1995 (%) (n = 111)	2001 (%) (n = 118)	*P* Value	1995 (%) (n = 103)	2001 (%) (n = 92)	*P* Value	1995 (%) (n = 420)	2001 (%) (n = 417)	P Value
Topic Only	35	4	<0.001	37	49	0.02	41	64	0.005	48	76	0.05	40	47	0.13
Methods	49	96	0.001	38	42	0.15	34	26	0.40	31	20	0.05	39	47	0.07
Dataset	2	2	**	8	9	0.44	5	11	0.11	0	0	**	4	6	0.15
Results	23	0	<0.001*	23	4	0.005	25	3	<0.001	22	4	<0.001	24	3	<0.001
Conclusions	0	0	**	1	1	**	1	0	**	0	0	**	0	0	**

Sum of categories is greater than 100% for most columns because some article titles contained information about more than one element (such as Methods and Results).
*Cell counts increased from 0 to 1 to allow for chi-square test.
**Chi-square test could not be performed because of inadequate expected cell counts (<5).

in the *BMJ* and *NEJM* and the "conclusions" category for all journals. Chi-square *P* values of less than 0.05 were considered statistically significant. Statistical analyses were performed with SAS software.[4]

Results

Titles in July through December 2001

Information about study methods appeared most frequently in *BMJ* titles—96% versus 20% to 42% among the other journals (Table). The percentage of Topic Only articles was lowest in *BMJ* titles—4% versus 49% to 76% among the other journals.

Many titles of articles in *Lancet*'s online journal were expanded, in most cases to include a colon placed at the end of the hard-copy title followed by an additional phrase that contained information about study methods. For example, the article in the 7 July issue titled "Effect of Low-Dose Mobile versus Traditional Epidural Techniques on Mode of Delivery" had the following title in the online journal: "Effect of Low-Dose Mobile versus Traditional Epidural Techniques on Mode of Delivery: A Randomised Controlled Trial". As a result, the number of *Lancet* titles that included information about study methods was much higher among the online listings—73% versus 26% among the print titles. The percentages of Topic only, Results, and Dataset titles in *Lancet* online were 22%, 5%, and 14%, respectively.

Comparison of 2001 and 1995 Titles

Among *BMJ* titles, the percentage of Methods titles increased from 49% in 1995 to 96% in 2001 ($P = 0.001$), whereas the percentage of Topic Only and Results titles decreased from 35% to 4% and from 23% to 0%, respectively (both, $P < 0.001$). Among titles in the other three journals, the percentage of Topic Only titles increased ($P \leq 0.05$), and the percentage of Results titles decreased ($P < 0.01$).

Comment

Compared with 1995, the percentage of titles in 2001 that included information about study methods increased only in the *BMJ*. The change is consistent with *BMJ* editorial policy that titles should include the study design if the paper presents original research. That policy was initiated on an informal basis in the middle 1990s (personal communication, Richard Smith, July 2003) partly in response to the results of a survey of *BMJ* authors and readers and was adopted formally some time after 1 January 1997 (the last time the *BMJ* published "Advice to authors" in hard copy).[5]

Current practices regarding the content of titles in the *BMJ* are consistent with the recommendation that titles of medical-journal articles include information about study design and methods.[3] Those practices may be viewed as a service provided by editors at the *BMJ* and *Lancet Online* to disclose more visibly the characteristics of articles and as a means of assisting readers to judge at a glance their level of interest in a given article. We suggest that other journals adopt similar practices and policies and that the ICMJE consider publishing similar guidelines.

Whereas the change in distribution of *BMJ* titles appears to reflect that journal's change in editorial policy, we believe that the decrease in Results titles and the corresponding increase in Topic Only titles in the other journals does not reflect a change in editorial policy. Rather, we attribute the changes to our applying more stringent criteria to 2001 titles than to 1995 titles. For example, we applied the following criterion when we reviewed 2001 titles: Titles

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that contain "key" words listed in the Results typology (such as *association*) do not qualify automatically as "results"; they must contain "some specification of a relation regarding what the authors found".

We view the 2003 change in the ICMJE guidelines as a favorable step and hope that study design and methods will come to be widely accepted as "important information" to include in the titles of scientific articles. The example above from the 7 July 2001 issue of T*he Lancet* shows that a colon can be a useful tool for adding information about study design and methods to a title—an approach suggested by Hartley.[6]

To facilitate implementation of the ICMJE's recommendation to include information about study design in article titles, it will be helpful to develop consensus criteria for what constitutes information about study methods and design. We recommend further studies to assess knowledge about and the effect of the *BMJ* author guidelines and the ICMJE guidelines as they relate to the information content of research-article titles.

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