How do studies get selected for publication?

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The factors predicting the eventual impact of scientific research (i.e. high citation rates) were successfully identified in abstracts selected for presentation at the annual ESC Congress. Interestingly, predictors of publication in peer reviewed scientific journals differed markedly from those predicting later scientific impact, finds a recent study published online today in the *European Heart Journal* (*EHJ*).

The main factors predicting acceptance at the ESC Congress – in line with identified predictors of scientific impact – were the number of enrolled patients (>100) and prospective study design. In contrast, the factors predicting full-text publication in peer reviewed scientific journals were the institutional affiliation of the authors (i.e. university-affiliated institutions fared better than non university-affiliated institutions) and the gender of senior authors (males did better than females), finds the scientometric follow-up in the *EHJ* study.

The study, which provides a unique glimpse behind the "curtains" of the selection process of contemporary cardiovascular science at both congress and journal level, may indicate a hitherto unrecognised bias against non-academic institutions and female senior authors in journal study selection. "Neither gender nor institutional affiliation delineate scientific quality, which may cause some concern but requires further investigation," says the study first author Dr Stephan Winnik, a cardiologist in training at the University Hospital of Zurich, Switzerland.

The differences, he adds, may be due to the fact that abstracts submitted to the ESC Congress are subject to a double-blinded peer review process

(where neither authors know reviewers nor vice versa); while the majority of scientific and medical journals (around 80%) use single-blinded peer review, where the reviewers know the identity of the authors, but the authors do not know the identity of reviewers. "Peer review has been and will be the sacred pillar of science, nonetheless our study suggests that introducing a double-blinded approach to journal review merits serious consideration," says Winnik.

The authors set out to identify factors that predicted the future success of studies as both abstracts and full-text articles, using the number of citations in the two years following publication as a surrogate for scientific quality. "The unique opportunity of this approach was the possibility to follow the same cohort of both accepted and rejected abstracts from first submission at a scientific meeting, through their full-text publication and subsequent impact after publication" says Winnik.

First, all 10,020 abstracts submitted to the 2006 World Congress of Cardiology in Barcelona (which combined the ESC and World Heart Federation congresses) were fed into a database; subsequently they were analysed according to whether they were accepted or rejected for presentation, and whether accepted studies were oral or poster presentations.

Next, a representative random selection of 10% of all submitted abstracts (n=1002) was analyzed according to a pre-specified set of variables, with the study cohort followed for five years for full-text publication and subsequent citation. Multivariate regression analyses were performed to identify predictors of scientific success at three major stages of the publication process – acceptance at the ESC Congress, subsequent full-text publication and the number of citations. The pre-specified variables included whether a study was clinical or basic, the type of institution where it took place, the study design, the number of patients enrolled, the field of clinical research and the gender

of the first and last authors.

The following findings of the study are of note:

- The journal publication rate of accepted congress abstracts was 38%, whereas only 24% of rejected congress abstracts were subsequently published.
- Factors predicting success at congress level were basic research (OR 2.2, 95% C.I. 1.4-3.6); patient number >100 (OR 2.1, 95% C.I. 1.5-2.8); prospective (non-randomised) study design (OR 1.70, 95% C.I. 1.2-2.3); and randomised controlled study design (OR 1.9, 95% C.I. 1.1-3.3).
- Factors that predicted full text publication in a peer reviewed journal were basic research (OR 2.1, 95% C.I. 1.3-3.3); institutional affiliation to a university (OR 1.6, 95% C.I. 1.1-2.4); and gender of senior author, with female senior authorship being negatively associated with publication (OR 0.50, 95% C.I. 0.3-0.9).
- Factors that predicted frequency of citation were randomised controlled study design (OR 6.8, 95% C.I. 2.5-21.1); and prospective (non-randomised) study design (OR 2.6, 95% C.I. 1.2-5.7).

"Given these data and other reports that blinded peer review does not only reduce bias but improve scientific quality, it can be speculated that blinded peer review merits consideration on a broader scale," state the authors in the discussion section of their article.

In an accompanying commentary Joseph Ross and Brahmajee Nallamothu, from Yale University School of Medicine, write, "The ESC did appear to choose wisely. Higher average peer reviewer ratings, and thus initial acceptance by the ESC, were associated with higher rates of

publication and citation."

Nonetheless Ross and Nallamothu conclude that the fact that 70% of abstracts submitted to the 2006 World Congress of Cardiology remain unpublished five years later is "an unacceptable standard for scientific discourse".

Commenting on the study Professor Thomas F. Lüscher, editor of the *EHJ* and one of the authors of the article, says, "This study reassures us that the peer-review process of the ESC Congress works well, and provides an important quality control."

But the results at the full-text publication level are cause for concern, he adds, highlighting the finding that the type of institution where a study was performed predicted whether or not the study was published. "Whether this indicates that academic institutions are more successful in publishing their work due to experience and expertise or whether this reflects a bias against non-university institutions requires further study," says Lüscher, from the University Hospital of Zurich.

The possibility of blinding journal reviewers to both author identity and affiliation, he adds, warrants future consideration. At present, the *EHJ* follows the single-blinded approach. "We have discussed the possibility of changing to a double-blinded review process, but are aware that this would involve additional work and man-power, which is currently not available within our editorial office," he said.

Moreover, Lüscher adds, in the case of technically challenging projects, valuable insight can be gained from knowing the capabilities of the institutions involved.

The female gender of authors, says Lüscher, has the possibility to affect publication success in several ways. "Female scientists are more likely to

work part-time and/or have other family obligations than their male counterparts, making finishing and publishing studies more difficult."

But there might also be a bias against females. "I have never experienced any such bias working with many journals, and additionally depending on the culture and name of authors gender is often not readily obvious."

More information: S Winnik, D Raptis, J Walker, et al. From Abstract to Impact in Cardiovascular Research- Factors Predicting Publication and Citation. EHJ. doi:10.1093/eurheartj/ehs113

J Ross and B Nallamothu. Through the Looking Glass: Evaluating the Dissemination of Research in Cardiology. doi:10.1093/eurheartj/ehs160

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