

# Using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement to Assess Reporting of Observational Trials in Hand Surgery

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**Purpose** To use the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement checklist to critically evaluate the change in quality of observational trial reporting in the *Journal of Hand Surgery American* between 2005 and 2011.

**Methods** A cross-sectional analysis of observational studies published in the *Journal of Hand Surgery American* was designed to sample 2 6-month periods of publication (March 2005 to August 2005 and June 2011 to November 2011). Fifty-one items were extracted from the STROBE statement for evaluation. Overall STROBE compliance rates for articles and specific checklist items were determined. Final compliance percentages from each period were compared by Student *t*-testing. Changes in item compliance over time were quantified.

**Results** Overall compliance with the STROBE statement was 38% (range, 10%–54%) in 2005 and 58% (range, 39%–85%) for 2011 manuscripts representing a significant improvement. Seventy-five percent or greater of articles (2005/2011) provided the explicit reporting of background (100%/97%), follow-up time (85%/94%), overall interpretation of data (100%/94%), and results of similar studies (95%/89%). Twenty-five percent or less of articles provided the study design in the abstract (10%/20%), a clear description of the study's setting (10%/23%), the handling of missing data (0%/6%), the potential directions of bias (5%/11%), and the use of a power analysis (0%/17%). Eighty-six percent (44/51) of items were more frequently satisfied in 2011 articles than in 2005 publications. Absolute increases in compliance rates of 40% or greater were noted in 10 items (20%) with no worsening in compliance for an individual item over 6%.

**Conclusions** The overall quality of the reporting of observational trials in the *Journal of Hand Surgery American* improved from 2005 to 2011. Current observational trials in hand surgery could still benefit from increased reporting of methodological details including the use of power analyses, the handling of missing data, and consideration of potential bias. (*J Hand Surg* 2013;38A:1584–1589. Copyright © 2013 by the American Society for Surgery of the Hand. All rights reserved.)

**Level of evidence** Diagnostic III.

**Key words** STROBE, cohort studies, observational studies, reporting.



HIGH-QUALITY RESEARCH is necessary to provide a basis for the practice of evidence-based medicine. Surgical disciplines, compared with medical specialties, are less likely to produce random-

ized controlled trials owing to feasibility and logistical and ethical concerns.<sup>1</sup> As a result, hand surgical literature includes a preponderance of observational studies. At a time when translation of scientific findings into

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clinical practice is at a premium, investigators must conduct scientifically sound studies and produce detailed transparent manuscripts “so that readers can follow what was planned, what was done, what was found, and what conclusions were drawn.”<sup>2</sup>

The Strengthening the Reporting of Observation Studies in Epidemiology (STROBE) statement was produced in 2007 to “improve the quality of observational study reporting, improve transparency in reporting, and allow for critical assessment by others of the strengths and weaknesses in study design, conduct, and analysis.”<sup>2</sup> A team of 23 editors, epidemiologists, methodologists, statisticians, and practitioners from Europe and North America created this statement.<sup>3</sup> The STROBE statement provides a 22-item checklist of items for inclusion in the reporting of all observational studies including components of the study design, interventions, data collection, analytic techniques, and potential bias. Available checklists are specific for each of the 3 observational study designs (i.e., cohort, case-control, and cross-sectional). Use of these checklists is intended to improve the reader’s ability to assess, interpret, and generalize study findings.

The quality of general orthopedic and plastic surgery reporting has been analyzed using the STROBE statement.<sup>4,5</sup> However, it is currently unknown how well reporting in hand literature would satisfy the STROBE checklist and how the quality of hand surgical research has changed since the introduction of the STROBE statement in 2007. The purpose of this study was to use the STROBE statement to critically evaluate the change in quality of observational study reporting in the *Journal of Hand Surgery American (JHS Am)* between 2005 (before both JHS requiring level of evidence reporting and the publication of the STROBE statement) and 2011 (4 years after the introduction of the STROBE statement). We tested the null hypothesis that the quality of reporting for observational studies would be unchanged between the 2 time periods.

## METHODS

### Identifying studies

A cross-sectional analysis of observational studies published in *JHS Am* was designed to sample 2 6-month periods of publication. This was chosen to result in precise estimation (95% confidence interval [CI]  $\pm$  4%) of mean overall compliance with STROBE items assuming 20 articles per period (assuming 50% compliance and 35 applicable checklist items per article) and confirmed to produce a study comparable with similar prior investigations.<sup>6</sup> The first study period was from March 2005 through August 2005. This preceded

the decision detailed in the September 2005 *JHS Am* issue to publish assigned levels of evidence to clinical studies in order to “improve the quality of published articles and provide objective benchmarks to measure the scientific methodology of the clinical studies.”<sup>7</sup> The second study period was from June 2011 through November 2011. This period was selected to represent current reporting 6 years after introduction of level of evidence reporting and 4 years after publication of the STROBE statement.

The abstracts of all published articles in JHS during the selected time periods were reviewed by 2 investigators. For purposes of this investigation, all cohort, case-control, and cross-sectional observational studies were selected for evaluation with the STROBE statement (Appendix A, available on the *Journal’s* Web site at [www.jhandsurg.org](http://www.jhandsurg.org)). Eighty-eight abstracts were reviewed from 2005. Twenty-one observational studies were identified consisting of 4 case-control studies, 17 cohort studies, and 1 cross-sectional study. Ninety-three abstracts were reviewed from 2011. Thirty-five observational studies were identified consisting of 4 case-control, 28 cohort, and 3 cross-sectional studies.

### Checklist

Fifty-one items were extracted from the STROBE checklists for evaluation. These items were based upon previous published assessments and defined explicitly for each reviewer.<sup>8</sup> To maximize inter-rater reliability, each investigator independently reviewed 1 observational study before scoring articles for this investigation. All investigators collectively reviewed this initial study, discussed any rating discrepancies, and clarified scoring of review items.

Each checklist item was categorized as “yes” (met the criteria), “no” (did not meet the criteria), or “not applicable.” Each manuscript was reviewed by 2 of 4 authors with 1 author (A.A.S.) reading all articles. Each reviewer evaluated the article content independently. Discrepancies were resolved by consensus among the reviewers and the senior author (R.P.C.).

### Data analysis

Reviewer datasets were collected on article grading sheets and entered into an electronic database for tabulation and descriptive statistics. If a study contained no statistical analysis, a “no” was entered for the first item concerning use of statistical methods, and subsequent items for statistics were marked “not applicable.” When determining both overall STROBE compliance rates for articles and compliance rates with specific checklist items, the number of “yes” ratings was divided by the

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