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Short Communication

The Need for a Global Registry of Descriptive Anatomical Studies on Rare Variants to Mitigate Publication Bias

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Meta-analyses of prevalence studies in anatomy are increasingly being used to draw conclusions regarding the frequency of rare anatomical variants. However, a major and largely underrecognized threat to the validity of these efforts lies in publication bias due to selective reporting. As demonstrated in a recent study, this bias may not only distort individual findings but may systematically inflate the pooled prevalence estimates of such variants—particularly when studies are retrospective, small, or lack pre-registration [1].

In the current scientific ecosystem, descriptive observational studies in anatomy are rarely pre-registered. Negative results—i.e., the absence of a particular anatomical variation—are seldom published, while positive findings, even from studies with minuscule sample sizes, are likely to be disseminated. This leads to a pernicious asymmetry: rare variants are more frequently "discovered" than disproven, resulting in inflated prevalence estimates, as the absence of evidence is not systematically recorded [2].

Papadopoulos et al. illustrate how this process mimics the phenomenon of HARKing (Hypothesizing After Results are Known), wherein the discovery of a rare variant in a small cohort retrospectively justifies the publication of prevalence data. This practice, when compounded across multiple such studies, propagates a cumulative publication bias in meta-analytic estimates—particularly acute in studies dealing with anatomical features that occur with a prevalence <1%.

Using both empirical data and simulations, the study quantifies the maximum publication bias (b(obs)) due to selective reporting. The theoretical bias in some studies reaches up to 50% when a single case is reported in a small cohort, a situation surprisingly common in anatomical research. For instance, in the analysis of dorsal wall agenesis of the sacral canal and arc of Bühler, adjustment for selective reporting reduced the pooled prevalence from 0.017 to 0.013 and from 0.015 to 0.013, respectively [3, 4]. In the case of azygos lobe, which involved much larger samples, the observed and adjusted values remained largely similar—highlighting how sample size mitigates bias [5].

Notably, conventional tools for assessing publication bias—Egger's and Begg's tests, funnel plots, trim-and-fill analysis—proved insufficient to detect or correct for such bias reliably. Only the Doi plot and the LFK index showed consistent performance in identifying and quantifying asymmetry, particularly when comparing data before and after adjustment for reporting bias.

To safeguard the integrity of future meta-analyses in anatomy, we advocate for the establishment of an international registry for descriptive anatomical studies—a platform analogous to e.g. ClinicalTrials.gov, but dedicated to observational anatomical research. This registry would require prospective registration of study protocols, especially for investigations of rare variants. Its major contribution would be to promote transparent reporting, including the publication of null results, to serve as a valuable source for unbiased meta-analytic inclusion, and to enhance methodological rigor and reproducibility in anatomical science.

Such a registry could be initiated under the auspices of academic and professional societies, particularly within the framework of international congresses on clinical and surgical anatomy. We envision it as a collaborative effort between anatomists, statisticians, journal editors, and database curators, modeled after established registries in clinical research.

The time has come to bring descriptive anatomical research into the era of scientific accountability and transparency. Without the implementation of systematic pre-registration, the discipline remains vulnerable to structural distortions in evidence synthesis. The creation of a global registry is not only feasible—it is essential.

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