



# Clinical Trials in India: Missing the Finish Line

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Nonpublication of clinical trials leads to distortion of data available in medical literature.<sup>1</sup> To address these issues, the US congress authorized the creation of a clinical trials registry, Clinicaltrials.gov, which would ensure that the public had access to information on clinical trials.<sup>1</sup> Subsequently, the Clinical Trials Registry India (CTRI) was established in 2007.<sup>2</sup> To decrease publication bias, the International Committee of Medical Journal Editors (ICMJE) made it mandatory for all clinical trials to be registered prospectively, for these trials to be considered for publication in member journals.<sup>3</sup> The CTRI followed suit in April 2018 and made a similar requirement for trials conducted in India.<sup>2</sup>

Studies that have looked at the rates of publication in other registries such as Clinicaltrials.gov have found that the rates of nonpublication of results are significant, with some studies showing nonpublication rates as high as 54%.<sup>1</sup> We recently published a research study that investigated publication rates of clinical trials in the CTRI.<sup>4</sup> We identified cancer clinical trials registered in CTRI till February 2016. In doing so, we ensured that there was enough time for the trials to be published since the manuscript search started in December 2019. We identified 133 trials, which met our criteria of completed, interventional trials. We conducted a literature search to identify the publication rates of these trials. For a trial to be considered published, any data pertaining to the trial should have been published in a peer-reviewed journal.

Of the 133 studies, 73 (54.9%) were published. We found that randomized controlled trials were more likely to be published than nonrandomized trials (61.4 vs. 34.4%,  $p = 0.007$ ). We did not find any association between the type of sponsor (pharmaceutical vs. nonpharmaceutical) and the likelihood of publication (53.1 vs. 60%,  $p = 0.479$ ). We also did not find a difference in the rates of publication in prospectively versus retrospectively registered studies (49 vs. 61%,  $p = 0.14$ ).

We did, however, find that trials were more likely to be published if they were sponsored by global pharmaceutical companies compared with Indian pharmaceutical companies (71.7 vs. 23.7%,  $p < 0.00001$ ). Also, trials were more likely to be published if they were conducted at a multinational level compared with trials conducted in India alone (84 vs. 37.3%,  $p < 0.00001$ ).

Our study shows that publication rates of completed clinical trials are suboptimal. Nonpublication of clinical trials can be detrimental to public health.<sup>5,6</sup> There could be several reasons for the nonpublication of clinical trials. It is possible that trials with statistically nonsignificant or negative results are less likely to be published. Even though positive clinical trials indicate clinical advancement, it is important that negative trials be published, because it informs us which treatment options should not be used.<sup>7</sup> Investigators may also choose not to publish if the results are different from what they anticipated. Protection of intellectual property could also be a consideration.<sup>1,8</sup> Studies undertaken by international pharmaceutical companies and at a multinational level are more likely to be published. The reason for such a situation is unclear, although we can hypothesize that there is a higher standard for transparency and research integrity. There is also more assistance and mentoring in conducting and completing trials. The extremely low publication rates of trials conducted in India alone (37.3%) should therefore be a cause for concern.

Nonpublication of results is a disservice to the participants of the studies. Participants often agree to participate in clinical not for the individual gains, but often for societal gains. Publication of research promotes transparency and ensures that all data are available to the public. The reason for low publication rates of clinical trials conducted in India is unclear. Could it be due to lack of motivation on the part of the researchers, or the lack of a proper research

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infrastructure in India? Could it be possible that medical journals are biased against trials conducted by researchers in low- and middle-income countries like India?

In our analysis of the trials registered on the CTRI, we also found that many trials did not have their results entered on the website. However, the CTRI is working toward disclosure of results in a structured manner.<sup>2</sup> We also found that 50.4% of trials were registered retrospectively. Retrospective registration of trials can introduce bias since favorable outcomes are more likely to be reported or published.<sup>9</sup> Hopefully, the new CTRI mandate for compulsory prospective registration of trials will change that statistic for the better. Despite the push for more clinical research in India, we still have plenty of strides to make. Our findings should lead to introspection and action. We must push more cancer clinical trials in India to the finish line.

#### Authors' Contribution

Vinay Mathew Thomas and Aju Mathew were responsible for drafting, revision, and for final approval of the article for publication.

The manuscript has been read and approved by all the authors, the requirements for authorship as stated earlier in this document have been met, and each author believes that the manuscript represents honest work.

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#### Conflict of Interests

The authors declare that there is no conflict of interest.

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