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Letter to Editor

How to reduce waste research in systematic reviews of oral diseases

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To Editor,

Systematic reviews (SRs) are the most reliable studies for determining the evidence available via the evidence-based approach.[1] A new dental treatment is rarely used in the clinical field unless the results of a related review or structured review confirm its usefulness and safety.[2] Compliance with the basic principles of conducting structured reviews reduces bias in the results. The quality of the design and the correct way of conducting these reviews have a direct and undeniable impact on the validity of the review and the methodological flaws of reviews with poor designs, which are identified by the incorrect presentation of the effects of treatment, ultimately lead to patient failure.[3] However, another problem that can be seen in clinical inference from the findings of structured reviews is the difficulties that researchers conducting these reviews face. These challenges appear to have contributed to the presence of a recurring stereotype in the conclusion sections of structured review reports, often highlighting a 'gap in knowledge' within the respective field of research. These conclusions will not be helpful for the clinical application of this research and, in addition, will prevent additional research in the future because future researchers will try to avoid repetitive work, and journals will avoid publishing duplicate titles. Therefore, critical appraisal of SR reports is necessary to check for potential errors. Today, structured reviews are frequently being conducted in dental research. The PRISMA-P (Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocol) tool is one of the most widely used checklists for critically evaluating structured reviews.[4,5]

The results of two recent studies have shown that for most of the items examined in the PRISMA tool, despite the use of the tool by the authors and editors of journals, no significant improvement in quality has been observed.

Additionally, mechanisms are needed to enhance the alignment of these tools with the methodology and reporting standards of SRs.[6]

Conducting several SRs on small clinical trials (with insufficient sample sizes) wastes approximately 85% of the budget spent on health research.

In the prestigious Cochrane collection, an attempt has been made to prepare practical guidelines by integrating all clinical trials, reviews, and meta-analyses on this topic. However, the reviews have shown that the average number of clinical trials reviewed in each review of this collection is 6–16 and that the average number of patients examined per clinical trial is 80.

Thus, such a review of low-quality clinical trials conducted in a single center with small sample size and low precision causes various types of bias.

For example, clinical trials with negative results are less likely to be published (publication bias), perpetuating a vicious cycle of publishing small-scale clinical trials instead of large, comprehensive studies.[7]

A review of 100 structured reviews by the authors of the present article showed that meta-analysis was performed for only 36% of the studies. Twenty-four percent of the mentioned studies were included on the Cochrane website, and 45% of the relevant proposals were registered in PROSPERO. Only 20% of the studies were reviews of randomized studies. A knowledge gap was clearly mentioned in 50.5% of the studies. In 33% of the results of these reviews, the need for quality RCT studies has been proposed. However, after the publication of structured reviews, a clinical trial was conducted in that area only in 33.7% of cases. One of the reasons for the low number of references to randomized clinical trials in the reviewed

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SRs is the inclusion criteria defined by the researchers. The criteria lead to ignoring grey studies to be double-masked.[8]

Structured reviews conducted on weak clinical trials are ultimately not reviewed to summarize and provide a clear answer to the related PICO question, which wastes research resources. Lund et al believed that structured reviews based on small studies could also be considered acceptable if the researchers are methodologically strict enough to reduce bias and avoid misunderstandings by correctly reporting results.[9]

All the findings should be published to prevent publication bias; however, we know that the majority of researchers and journals, including those in dental sciences, avoid publishing negative results, and this issue contributes to the increase in publication bias.[10]

literature, reviewing only English-language articles included in Medline, and requiring

Investments in biomedical research at the global level reached 240 billion dollars in 2010. In response to whether this number has led to improvement in human health, it should be noted that a significant percentage of this research is carried out at the level of basic sciences to understand the mechanisms of diseases.

Additionally, studies with acceptable designs are not necessarily associated with achieving the desired results; therefore, basic research and research with negative results should not be considered a waste of financial resources.[11]

The results of 75 clinical trials and 11 structured reviews are added daily to the extensive Cochrane collection. If the collection attempts to summarize the results of reviews and optimize the use of patients, researchers, and health policymakers, it is necessary to reduce unnecessary trials, and structured reviews should be prioritized.[12]

The common flaws identified in the reviewed articles when summarizing the findings include heterogeneity among study results, the low quality of available evidence, a high risk of bias in previous studies, and insufficient sample sizes and follow-up durations.

It is often suggested that future studies be conducted in a multicenter, high-quality, and minimally biased manner, preferably in clinical trials with an acceptable design and prospective studies with adequate sample sizes are needed to address these shortcomings.

The repeated mention of these shortcomings and their proposed solutions in the conclusion sections of structured reviews has become so common that it raises concerns that they may turn into a stereotype. This, in turn, prompts the question of to what extent researchers adhere to previous recommendations when addressing clinical questions and designing future studies

As an example of the design of RCTs, we can discuss the sample size factor.

The greatest clinical effects of therapeutic interventions are often reported in randomized controlled trials (RCTs) with small to medium sample sizes.[13]

Additionally, when we look at the problem through the lens of a factor such as sample size, we realize that perhaps the significant clinical effects of many therapeutic interventions are rooted in the lack of a large sample size for the relevant trials.

Jones et al reported that in 77.1% of the clinical trial studies reviewed, a structured review related to the subject of that trial was cited. In 47.1% of the cases, the information in the previous structured reviews was used to design a new clinical trial.[14]

To minimize bias in SRs and meta-analyses (MAs), researchers should consider the findings of previous reviews on the subject when designing their clinical trials.

Indeed, registering SR studies in the reliable PROSPERO database is an effective way to enhance their credibility. Because relevant proposals are evaluated several times by expert referees before being registered in such a database, feedback from these evaluations to relevant researchers will lead to methodological reforms and, as a result, increase the quality of the articles.

Our review showed that in the field of oral diseases, structured reviews were conducted on the highest level of evidence (i.e., RCTs) in approximately one-third of the cases; meta-analysis was performed in approximately one-third of the reviews.

The conclusion of these reviews in half of the cases has pointed to a knowledge gap in the relevant subject. In two-thirds of the results of the reviews, it is mentioned that there is a need to conduct additional research in that field; ultimately, in one-third of the cases, another RCT has been published in that field after the publication of the structured review.

First, researchers in oral diseases should improve the methodological quality of randomized clinical trials and avoid trials with poor methodology. Researchers conducting structured reviews should also prioritize the selection of new research topics and avoid unnecessary repetition.

After conducting a structured review, the results of which imply a knowledge gap in that area, other researchers should be given a chance to try to fill these gaps by conducting RCTs; carrying out successive structured reviews without paying attention to such points will lead to the accumulation of a large amount of fruitless research.

Additionally, referring to the results of previous structured reviews is necessary when conducting clinical trials to avoid wasting resources.

Authors' Contribution

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None declared.

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