pooled effect size estimate was 0.21, which was not statistically significant (95% confidence interval −0.05 to 0.47). In their conclusion, the authors state that the effect of interventions to enhance oral antidiabetic drug adherence was "small." We repeated the meta-analysis after removing the retracted trial [1]. There was a modest increase in the pooled effect size (0.27; 95% confidence interval −0.01 to 0.54), which was borderline statistically significant ($P = 0.05$). It could be argued that the removal of the retracted trial does affect the conclusion, and equally it could be argued that it does not affect the review conclusion. This is perhaps an author's and editor's judgment to make.

Conclusions

The authors of the Cochrane handbook [7] for systematic reviews remind us that publication does not mark the end of the review process. Authors have a duty to monitor changes in the status of included articles (such as retraction). The publication of a single study in three different journals [1,3,4] raises complex questions about the integrity of the systematic review by Zomahoun et al. [2], which the authors need to clarify. We think it is important to transparent reporting of science that you make readers aware that this review includes a trial that was retracted after the review was published.

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Author's Reply

We thank the editor for giving us the opportunity to reply to this letter to the editor. In this letter, the authors raise concerns about our article titled "Effectiveness and content analysis of interventions to enhance oral antidiabetic drug adherence in adults with type 2 diabetes: Systematic review and meta-analysis" and about the publication and review process of systematic reviews and meta-analyses. More specifically, the letter raises three main issues. The first two issues refer to the responsibilities of authors and editors/reviewers, whereas the third issue refers to the effect the retraction of one article may have had on the results and conclusions of our systematic review and meta-analysis. We are happy to comment on each of these issues.

Did the Authors Make an Error?

We thank the authors for acknowledging that at the time our review was conducted we could not identify the retraction of the trial by Zolfaghari et al. [1] published in 2012 in the *Journal of Clinical Nursing* and titled "The impact of nurse short message services and telephone follow-ups on diabetic adherence: Which one is more effective?" Indeed, the literature search strategy of our review was conducted on September 3, 2013 [2], whereas the retraction was later published on March 29, 2016 [3].

Nevertheless, we are asked to clarify why the trial by Zolfaghari et al. [4] published in 2012 in the *Journal of Diabetes and Metabolic Disorders* and titled "Mobile phone text messaging and telephone follow-up in type 2 diabetic patients for 3 months: A comparative study" and its retraction published on March 7, 2013 [5], were not captured in our data search.

Our review aimed to estimate the pooled effect size of oral antidiabetic drug adherence-enhancing interventions and to explore which of the behavior change techniques applied in the intervention groups modified this pooled effect size in adults with type 2 diabetes [2]. Studies included in the review had to meet the following eligibility criteria:

1. *Types of population:* adults 18 years or older with type 2 diabetes who used oral antidiabetic drugs;
2. *Types of interventions:* interventions with at least one component aimed at improving oral antidiabetic drug adherence, regardless of the methods or techniques used;
3. *Types of comparators:* individuals with type 2 diabetes who were exposed to usual care and/or to an intervention of any sort;
4. *Types of outcomes:* original studies in which oral antidiabetic drug adherence was measured both before and after completion of the intervention; and
5. *Types of study designs:* randomized controlled trials, quasi-experimental studies, and controlled pre-/post-test studies.

On the basis of these inclusion criteria, we used the combination of concepts related to types of population (type 2 diabetes), interventions (intervention), and outcomes (medication adherence) to perform our literature search strategy in bibliographic databases from their inception up to September 3, 2013 (see

details of our search strategy in the Supplemental Materials of our review [2]).

Given our search strategy, any intervention trial in which medication adherence was not studied could not be identified. In the trial by Zolfaghari et al. [1] published in the *Journal of Clinical Nursing*, the outcomes were glycosylated hemoglobin level and adherence to treatment recommendations including physical activity, antidiabetic medication use, and diet. The key words were adherence, glycosylated hemoglobin, nurse follow-up, short message service, telephone calls, and type 2 diabetes mellitus [1]. Because some of these key words were used in our search strategy, this article was identified. Nevertheless, that was not the case for the trial published by Zolfaghari et al. [4] in the *Journal of Diabetes and Metabolic Disorders*, because glycosylated hemoglobin level was the only outcome considered in this trial article. Indeed, in this trial, "adherence" was neither an outcome nor identified among its key words.

Therefore, we do confirm that the trial by Zolfaghari et al. [4] published in the *Journal of Diabetes and Metabolic Disorders* and its retraction [5] did not appear in our search results.

Editorial and Reviewer Error?

The authors of the letter report that most journals put submitted manuscripts through plagiarism software to check for similarity. In addition, we think when a publication is retracted from a scientific journal, the journal editor has to immediately inform the managers of bibliographic databases (e.g., PubMed and Embase) in which their journal has been indexed. Although we do agree with this practice and hope one day it will be generalized, in fact, the delay of publication indexation in the bibliographic databases is relatively long. For example, in a recent article by Rodriguez [6], the median (interquartile range) time to index articles in PubMed was 52 (20–68), 186 (150–246), and 252 (168–301) days for medical, pharmacy, and nursing journals, respectively. Because it is difficult to identify the studies nonindexed in bibliographic databases, there is a real need to develop mechanisms to reduce the delay in indexing articles in bibliographic databases.

In addition, in their letter the authors suggest that reviewers should be expected to check whether studies included in a systematic review and meta-analysis are duplicates. We concur, although as the authors of the letter themselves suggest, "it may be a lot to expect of reviewers." Moreover, it may not be an easy task to implement such a procedure because we suspect that journal editors would be facing the following two major issues in particular if the number of study articles included in a review is large. First, editors would have to extend the time period expected from reviewers to assess a systematic review article. Second, they would have to make the plagiarism software available to their reviewers.

Does Retraction Affect the Results of Meta-Analysis?

The authors of the letter report that when removing the trial by Zolfaghari et al. [1] from our meta-analysis, they obtained a pooled effect size of 0.27 with a 95% confidence interval ranging from −0.05 to 0.47. As reported in the data synthesis and analysis section of our review (see p. 532), we performed multiple sensitivity analyses to test the effect of removing each trial one by one on the estimation of the pooled effect size [2]. The results of these analyses were reported in Table S6 of the Supplemental Materials published with our review [2]. From this table, it can be seen that when the trial by Zolfaghari et al. [1] is removed from the meta-analysis, the pooled effect size is indeed the same as the one calculated by the authors of the letter [2]. This result is not substantially different from the initial pooled effect size (0.21 with 95% confidence interval ranging from −0.05 to 0.47) [2] and still not statistically significant.

We thank the authors of the letter for raising the possible consequences of including in a systematic review and meta-analysis a study that is later retracted. They have made interesting suggestions that need to be further studied by journal editors. For the moment, as a first step authors could be encouraged to conduct and report the results of a sensitivity analysis as we did so that if one article is later retracted, then one can easily see the effect it has on the pooled effect size estimate. As far as our systematic review and meta-analysis are concerned, including the study by Zolfaghari et al. [1] did not affect our results and conclusion.

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