

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Conflict of interest and funding in health communication on social media: a systematic review
<b>AUTHORS</b>	Helou, Vanessa; Mouzahem, Fatima; Makarem, Adham; Noureldine, Hussein; El-Khoury, Rayane; Al Oweini, Dana; Halak, Razan; Hneiny, Layal; Khabisa, Joanne; Akl, Elie

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Robinson, Rebecca Royal Hallamshire Hospital
<b>REVIEW RETURNED</b>	09-Feb-2023

<b>GENERAL COMMENTS</b>	An important study on the rapidly changing influence of the internet on science and public health.
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<b>REVIEWER</b>	Raoult, Didier Assistance Publique des Hôpitaux de Marseille, Pôle de Maladies Infectieuses
<b>REVIEW RETURNED</b>	04-Apr-2023

<b>GENERAL COMMENTS</b>	<p>This work is very interesting and the subject is hot. Of course, such a work cannot be complete given the extent of the phenomenon. It is undoubtedly a contribution to the knowledge of the extent of the problem of conflicts of interest.</p> <p>The only point I regret is that there is not a small paragraph at the end on the declaration of conflicts of interest by the media themselves. In France alone, several hundred million Euros have been distributed by the pharmaceutical industry to the various media, including television stations and the newspaper "Le Monde", which is a reference newspaper. In addition, Bill Gates' direct or indirect funding amounts to hundreds of millions. Bill Gates himself has considerable conflicts of interest due to his investments in the vaccine and drug industry. Finally, the scientific journals themselves have considerable conflicts of interest that are not mentioned, and should be mentioned on the front page of the journals.</p> <p>The problem of conflicts of interest is, in fact, twofold: one is the declaration of conflicts of interest and the other is the acceptability of conflicts of interest. For example, throughout the COVID crisis, the Editor in Chief of Clinical Infectious Diseases was on the Gilead board, which led to a highly visible bias against all products competing with Remdesivir. There is even a real question as to whether there should not be journals without pharmaceutical industry-sponsored work, which would provide a more neutral view of the efficacy of current molecules.</p>
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	Finally, a work such as this should absolutely cite the viox and oxycontin cases, where the extent of the conflicts of interest led in one case to probably 60,000 deaths, and in the other case probably 500,000. I think a chapter highlighting this phenomenon and its seriousness is absolutely necessary.
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<b>REVIEWER</b>	Goodyear, Victoria University of Birmingham
<b>REVIEW RETURNED</b>	19-Jun-2023

<b>GENERAL COMMENTS</b>	<p>Thank you for the opportunity to read this article. I found the topic of great interest, and the importance of COI should be a key priority, particularly in the current context of debates about regulation and the narratives surrounding misinformation and 'fake news'. While the article delivered on this topical narrative, there were areas for development in relation to how the data and information were conceptualised with these broader trends and emerging concepts in media/health studies, as well as how the review had been conducted methodologically. I have listed 3 main areas for development in this article.</p> <p>Firstly, the article would have benefited from a further in-depth discussion of how COI is being conceptualised in this study, such as, what theoretical framings or concepts/frameworks does COI relate to, and how do the affordances of social media present challenges for health communication – concepts to be considered include: authenticity and credibility; misinformation; regulation. This would allow for a deeper framing of the research design and a further in-depth analysis of the study findings.</p> <p>Secondly, the methodological framing of the study requires more detail as there are some disconnects between methods and findings. Mainly, there was an absence of a research question, and it was unclear how the inclusion and exclusion criteria had been defined and operationalised. Further details on screening processes and how these followed evidence-based techniques could also be stated. Examples of how this lack of methodological detail manifests in the findings relate to: (a) the findings report that few studies mention a COI, but COI is part of the inclusion criteria? (b) The methods state that a quality review was completed, but the outcomes of this are not detailed; (c) the framing of COI is unclear, and as such the findings are reported descriptively and only 'surface level' insights are provided.</p> <p>Thirdly, impact and implications could be further developed. Given the review is on COI, an output seems to be guidance on the content of COI – rather than further evidence or that these should be developed. Overall, impact and implications from the study findings are limited because of the conceptualisation of COI and the methodological details. By knowing more about COI in these studies, the implications of this work could be improved by providing recommendations for what practitioners and organisations should say and do.</p>
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## VERSION 1 – AUTHOR RESPONSE

Ms. Rebecca Robinson, Royal Hallamshire Hospital

An important study on the rapidly changing influence of the internet on science and public health.

Thank you for the positive assessment.

Reviewer #2

Dr. Didier Raoult, Assistance Publique des Hôpitaux de Marseille

This work is very interesting and the subject is hot. Of course, such a work cannot be complete given the extent of the phenomenon. It is undoubtedly a contribution to the knowledge of the extent of the problem of conflicts of interest.

Thank you for the very positive feedback.

The only point I regret is that there is not a small paragraph at the end on the declaration of conflicts of interest by the media themselves. In France alone, several hundred million Euros have been distributed by the pharmaceutical industry to the various media, including television stations and the newspaper "Le Monde", which is a reference newspaper. In addition, Bill Gates' direct or indirect funding amounts to hundreds of millions. Bill Gates himself has considerable conflicts of interest due to his investments in the vaccine and drug industry. Finally, the scientific journals themselves have considerable conflicts of interest that are not mentioned, and should be mentioned on the front page of the journals.

The problem of conflicts of interest is, in fact, twofold: one is the declaration of conflicts of interest and the other is the acceptability of conflicts of interest. For example, throughout the COVID crisis, the Editor in Chief of Clinical Infectious Diseases was on the Gilead board, which led to a highly visible bias against all products competing with Remdesivir. There is even a real question as to whether there should not be journals without pharmaceutical industry-sponsored work, which would provide a more neutral view of the efficacy of current molecules.

Thank you for raising these important points. We added the following text to 'implications for practice and research' paragraph, page 17:

"Two crucial aspects that were outside the scope of this study, but deserve further consideration are the reporting of funding by the media and scientific journals and the declaration of interests by their editors [36]. Funding by, and financial relationships with pharmaceutical companies and other for-profit entities, have the potential to bias the information shared through media and journals publications. Indeed, a recent survey found that an extremely low percentage of peer reviewers and journals editors addressed study funding and authors' COI [37]. Also, the study found that peer reviewers and journal editors rarely declared their COI, or commented on their own or on each other's COI."

Finally, a work such as this should absolutely cite the viox and oxycontin cases, where the extent of the conflicts of interest led in one case to probably 60,000 deaths, and in the other case probably 500,000. I think a chapter highlighting this phenomenon and its seriousness is absolutely necessary.

Thank you for this suggestion. While we agree on the danger of aggressive marketing by pharmaceutical industry of their drugs, this topic is out of scope of our study which is specifically about the declaration of COI and funding in social media.

Reviewer #3

Dr. Victoria Goodyear, University of Birmingham

Thank you for the opportunity to read this article. I found the topic of great interest, and the importance of COI should be a key priority, particularly in the current context of debates about regulation and the narratives surrounding misinformation and 'fake news'. While the article delivered on this topical narrative, there were areas for development in relation to how the data and information were conceptualised with these broader trends and emerging concepts in media/health studies, as well as how the review had been conducted methodologically. I have listed 3 main areas for development in this article.

Thank you for your positive feedback. Please find our answers below.

Firstly, the article would have benefited from a further in-depth discussion of how COI is being conceptualised in this study, such as, what theoretical framings or concepts/frameworks does COI relate to, and how do the affordances of social media present challenges for health communication – concepts to be considered include: authenticity and credibility; misinformation; regulation. This would allow for a deeper framing of the research design and a further in-depth analysis of the study findings.

We have followed Akl et al. framework for defining, categorizing, and assessing conflicts of interest in health research (see 'Design overview and definitions' section). Here is how COI is defined: "a COI exists when a past, current, or expected interest creates a significant risk of inappropriately influencing an individual's judgment, decision, or action when carrying out a specific duty". The specific duty for individuals posting on social media (particularly professional figures with high number of followers) is to provide accurate and reliable information. This is extremely important given the potential impact on both clinical and public health decisions. Having conflicts of interests poses a significant risk of biasing their opinions leading to either misinformation or disinformation. Furthermore, the framework distinguishes financial and non-financial interests, both of which could lead to biased opinions and subsequent misinformation or disinformation. Accordingly, we added the following text to the introduction section, page 4:

"These challenges arise from the characteristics of social media, such as the rapid spread of information, user-generated content, and character limitation [4]. Users may share products or services with which they may have financial or non-financial interest, without disclosing their conflicts. This blurring of boundaries between personal opinions, professional advice, and undisclosed relationships can mislead the public and compromise the credibility of health communication." Also, we have added the following text to the discussion section, page 16:

"This is particularly important, considering our definition of COI. Indeed, the specific duty for individuals posting on social media (particularly professional figures with high number of followers) is to provide accurate and reliable information. This is extremely important given the potential impact on both clinical and public health decisions. Having conflicts of interests, whether financial or non-financial, poses a significant risk of biasing the opinions of individuals sharing their opinions on social media, leading to either misinformation or disinformation."

We added the following text in Design overview and definitions under the methods section to elaborate on the framework we used, page 5:

“We have followed Akl et al. framework for defining, categorizing, and assessing conflicts of interest in health research [5].”

Secondly, the methodological framing of the study requires more detail as there are some disconnects between methods and findings. Mainly, there was an absence of a research question, and it was unclear how the inclusion and exclusion criteria had been defined and operationalised. Further details on screening processes and how these followed evidence-based techniques could also be stated.

Thank you for your comments. We decided to change the description of the study design from ‘systematic survey’ to ‘systematic review’ to better define the methodological framing of the study, pages 1, 2, 4, 15 and 18. Indeed, we have reviewed studies that surveyed social media posts, as opposed to ourselves surveying these posts.

We would like to clarify that our objective is stated in the last paragraph of the introduction as follows, page 4:

“The objective of this study is to synthesize the available evidence on the reporting of conflicts of interest by individuals posting health messages on social media, and on the reporting of funding sources of studies cited in health messages on social media.”

Also, we have listed the following eligibility criteria in the methods section under the subheading ‘eligibility criteria’, pages 5-6:

“We included articles that meet the following eligibility criteria:

- Topic: conflict of interest on social media or funding;
- Type of social media: all platforms that fit the Web 2.0 definition, including blogs, Facebook, Instagram, Twitter, LinkedIn, and YouTube;
- Field: health field, including clinical, health systems and policy, public health and biomedical sciences;
- Study design: any primary study including surveys, research letters, and qualitative studies. We excluded editorials, abstracts, letters to the editor, reviews, and opinion pieces;
- Date of publication: 2005 to current (2005 being the year of the rise of Web 2.0);
- Language: any language.”

In order to ensure that we provided all necessary details illustrating our use of evidence-based techniques, we have followed the 2020 PRISMA statement for reporting of systematic reviews (see Supplementary file 3, PRISMA 2020 Checklist and Abstract Checklist).

Examples of how this lack of methodological detail manifests in the findings relate to: (a) the findings report that few studies mention a COI, but COI is part of the inclusion criteria? (b) The methods state that a quality review was completed, but the outcomes of this are not detailed; (c) the framing of COI is unclear, and as such the findings are reported descriptively and only ‘surface level’ insights are provided.

Thank you for raising these important questions

(a) yes, COI is an inclusion criterion for the studies (e.g., surveys) that we included (i.e., these studies should have examined the prevalence of COI in social posts). The posts included by those studies should have not necessarily declared COI, allowing the calculation of prevalence.

(b) As the reviewer suggests, we did conduct a quality assessment using the “Mixed Methods Appraisal Tool”. We provide the detailed results in supplementary file 6. The relevant text in the manuscript states, page 11:

“No major concerns were noted, except unclear appropriate measurements for 11 out of the 17 included studies.”

(c) Please see our response to the previous comment regarding the use of the framework by Akl et al. for defining, categorizing, and assessing conflicts of interest in health research. We have also added the following text to the discussion section, page 16:

“This is particularly important, considering our definition of COI. Indeed, the specific duty for individuals posting on social media (particularly professional figures with high number of followers) is to provide accurate and reliable information. This is extremely important given the potential impact on both clinical and public health decisions. Having conflicts of interests, whether financial or non-financial, poses a significant risk of biasing the opinions of individuals sharing their opinions on social media, leading to either misinformation or disinformation.”

Thirdly, impact and implications could be further developed. Given the review is on COI, an output seems to be guidance on the content of COI – rather than further evidence or that these should be developed. Overall, impact and implications from the study findings are limited because of the conceptualisation of COI and the methodological details. By knowing more about COI in these studies, the implications of this work could be improved by providing recommendations for what practitioners and organisations should say and do.

Thank you for your comments. We added the following text to implications for practice and research, page 16:

“Given the above, reporting conflict of interest and funding on social media is a basic requirement for the responsible use of social media, particularly during crises (such as the COVID-19 pandemic) associated with infodemics, misinformation and disinformation [34]. Healthcare professionals should be encouraged to disclose their conflicts of interest when sharing health-related content by referring to existing guidelines on physicians’ use of social media [6-9]. When using social media platforms with character limits such as Twitter, it is recommended to include a disclosure of interests by incorporating an electronic hyperlink to a standardized disclosure form, such as the one provided by the International Committee of Medical Journal Editors (<https://www.icmje.org/disclosure-of-interest/>). Alternatively, healthcare professionals can include a link to public reporting tools such as Center for Medicare and Medicaid Open Payments [4]. In addition, clear guidance and policies are needed for the reporting of COI and funding by health care professionals when using social media. Such policies can be developed through a collaboration between regulatory entities, professional organizations, and social media platforms. Healthcare providers can refer to published guidance on the reporting of funding [35]. In addition, improving public media literacy is essential to help users identify potential conflicts in health information and make informed decisions.”

## VERSION 2 – REVIEW

REVIEWER	Goodyear, Victoria
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	University of Birmingham
<b>REVIEW RETURNED</b>	26-Jul-2023

<b>GENERAL COMMENTS</b>	The authors have adequately addressed my previous comments for review.
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