PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	The effects of screentime on the health and well-being of children and adolescents: a systematic review of reviews
AUTHORS	Stiglic, Neza; Viner, Russell M

VERSION 1 – REVIEW

REVIEWER	Dr. Leigh Vanderloo University of Western Ontario, Canada The Hospital of Sick Children, Canada
REVIEW RETURNED	14-Jul-2018

GENERAL COMMENTS	Thank you for the opportunity to review this manuscript. Given the growing prevalence of screen-use among children, gaining a clear understanding of how this particular behaviour impacts the health and well-being of children and adolescents is important. That said, some findings are missing from the results section and I also some of the conclusions drawn from the results of the RoR are slightly overstated. I believe addressing some of the outlined comments below will help strengthen the paper. GENERAL COMMENTS I believe your objective statement could be a bit tighter and written a bit more concisely. How were articles that examining screen-viewing in the childcare handled in this review? The authors may want to consider including the review by Poitras et al (2018) published in BMC Public Health. In the results section, I believe some high-level information is missing describing the reviews (example: # of papers from included reviews, total # of participants, country of publication, etc.). For the 11 irretrievable articles, were the authors of the reviews contacted? Would it be possible to describe how the findings differ based on age group - early years, school-aged children, adolescents? It would be useful if the authors presented a better description of how "vote-counting" was avoided? How were the findings weighted based on the size/quality of reviews? Take care when drawing conclusions from the findings of this RoR. Example, the evidence "may" suggest...

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	How was risk of bias assessed in the current review? Using the AMSTAR tool? Please include additional references in the final paragraph of the discussion (prior to the limitations) to support the statements/claims. SPECIFIC COMMENTS -Abstract - you make no mention of "cognition" -page 4, line 14 - begin second sentence with "the" instead of "in" -eligibility criteria - not sure if "i" should be considered an eligibility criteria (revise accordingly) -Rather than using "young people" why not be consistent with your use of "adolescents"? -I don't think it is accurate for "hyperactivity and inattention" to be listed under the mental health heading (cognitive function would likely be better) -rather that just "pain" should it be listed as "physical pain"? -be consistent with your hyphenation/non-hyphenation of "well-being" and "screen-time" -page 13, line 40 - remove "and television screentime" -Table 1 - sometimes you use "A" and "Ad" to symbolize Respectfully submitted.

REVIEWER	Samantha Marsh National Institute for Health Innovation, University of Auckland
REVIEW RETURNED	17-Sep-2018

GENERAL COMMENTS	This manuscript provides a review of reviews on the effects of screentime on the health and well-being of youth. Overall this manuscript is succinct and well-written and I only have a couple of comments that the authors may want to address. Further, I think the review is important given the recent argument that screens being harmful may not be supported by solid research! 1. For transparency, it would help to make it clear in the discussion that comments like 'there was weak evidence for an association between screentime and sleep' doesn't specifically mean there is a weak relationship, but just that the review this comment was based on was only moderate or low quality. 2. Given that one of the aims of the review was to inform policy, the discussion could be a bit more comprehensive. For emphasis, one limitation is that due to the nature of the RoR process, you can't tease out differences by age groups. This could be very important, particularly given that the current generation of infants, toddlers, and preschoolers are the first to be exposed to such a high level of mobile media and interactive devices. More research is desperately needed. Further, it might be important to discuss that it could take many years before the true impact of modern screen-use behaviours (e.g. media multi-tasking, social media, mobile screen use) is completely understood. Finally, it would be interesting to see a bit more discussion around whether we should just be focusing on screen time. Screen use may affect two kids of the same age differently (regardless of content) depending on their temperament, relationships with family members, development e.t.c. Therefore should guidelines just be based on time limits and age ranges? Could recommendations also include indicators that a child isn't coping with the amount of

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	screen time they have??? And do we need to start providing guidelines based on different types of screens? For example, the impacts of video games vs social media vs TV viewing will be very different. Is it time to start thinking of these as separate behaviours?

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1 Dr. Leigh Vanderloo

I believe your objective statement could be a bit tighter and written a bit more concisely.

Response: We have revised our aim statement as follows:
"Our aim was to systematically examine the evidence on the effects of time spent using screens on health and wellbeing amongst CYP."

How were articles that examining screen-viewing in the childcare handled in this review?

Response: They were potentially eligible. However no systematic reviews specifically covered this area.

The authors may want to consider including the review by Poitras et al (2018) published in BMC Public Health.

Response: This review was not indexed at the time we undertook our searches. We would argue that systematic reviews must have cut off dates to mitigate the temptation to constantly update them.

In the results section, I believe some high-level information is missing describing the reviews (example: # of papers from included reviews, total # of participants, country of publication, etc.).

For the 11 irretrievable articles, were the authors of the reviews contacted?

Response: No. We have noted that in the limitations section.

Would it be possible to describe how the findings differ based on age group - early years, school-aged children, adolescents?

Response: We note in our results and discussion where findings apply to very young children. However data were not sufficient to allow us to comment in greater detail on findings by age group. We have included the following in our limitations section:

"Aside from reviews focusing on very young children, data from the included studies did not allow us to comment separately on findings by age group."

It would be useful if the authors presented a better description of how "vote-counting" was avoided? How were the findings weighted based on the size/quality of reviews?

Response: We have expanded our description of methods as follows:

"We then summarized findings across each domain according to the overall strength of evidence in terms of the consistency of findings across different reviews, the quality of the review, the design of included studies and how outcomes were assessed. In this we aimed to minimise so-called 'vote-counting' i.e. not quantifying the number of studies reporting positive and negative findings regardless of their size and quality. Instead we weighed findings according to the size and quality of reviews (as assessed by AMSTAR) as well as the design of primary studies.[13] In summarizing findings across reviews, we defined strong evidence as consistent evidence of an association reported by multiple high quality reviews, moderately-strong evidence as consistent evidence across multiple medium quality reviews, moderate evidence as largely consistent evidence across medium quality reviews and

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weak evidence as representing some evidence from medium quality reviews or more consistent evidence from poor quality reviews.”

Take care when drawing conclusions from the findings of this RoR. Example, the evidence "may" suggest...

Response: We have reviewed our Discussion and Conclusions and modified the language as suggested.

How was risk of bias assessed in the current review? Using the AMSTAR tool?

Response: Yes quality including risk of bias was assessed using the AMSTAR tool.

Please include additional references in the final paragraph of the discussion (prior to the limitations) to support the statements/claims.

Response: We have 3 references already in this paragraph, but have added further references both here and in the introduction relating to issues about weaknesses in the literature, issues separating different forms of screen use and content used and issues about potential benefits of screen use.

SPECIFIC COMMENTS
-Abstract - you make no mention of "cognition"
Response: There is a note in the abstract that there is weak evidence for “poorer cognitive development”

-page 4, line 14 - begin second sentence with "the" instead of "in"
Response: Done

-eligibility criteria - not sure if "i" should be considered an eligibility criteria (revise accordingly)
Response: We felt this was important to clearly define which reviews were eligible i.e. systematic reviews, which were defined as those which “Systematically searched and reviewed the literature using prespecified protocols”

-Rather than using "young people" why not be consistent with your use of "adolescents"?
Response: We used these terms slightly differently – in that we used adolescents as an eligibility criteria – however we reported literature using the term young people first as some age ranges may differ (e.g. the report that young people report using multiple screens to facilitate filtering out of unwanted content); and second as many young people tell clinicians they do not want to be called adolescents. This dual use is common in the literature.

-I don't think it is accurate for "hyperactivity and inattention" to be listed under the mental health heading (cognitive function would likely be better)
Response: We very much take the point, however ADHD is listed as a mental health disorder in the various psychiatric classification systems (e.g. DSM). We have left this under mental health.

-rather that just "pain" should it be listed as "physical pain"?
Response: We have renamed the section Physical pain but used pain elsewhere as short-hand.

-be consistent with your hyphenation/non-hyphenation of "well-being" and "screen-time"
Response: Very helpful thanks – corrected.

-page 13, line 40 - remove "and television screentime"
Response: We left this in as the meaning was that there was an association for both overall screentime and television screentime, however placed (and television screentime) in brackets to improve clarity.

-Table 1 - sometimes you use "A" and "Ad" to symbolize
Response: This was truncated – we explain the use of Ad for adolescent in the table notes. We found no use of A rather than Ad.

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Reviewer: 2 Samantha Marsh

1. For transparency, it would help to make it clear in the discussion that comments like 'there was weak evidence for an association between screentime and sleep' doesn't specifically mean there is a weak relationship, but just that the review this comment was based on was only moderate or low quality.

Response: We added the following statement to our Discussion in this section:

"It is important to note that the weak evidence reported here largely relates to a lack of literature rather than weak associations."

2. Given that one of the aims of the review was to inform policy, the discussion could be a bit more comprehensive.

Response: As noted above in Response to the Associate Editor, we have strengthened the discussion about policy implications.

3. For emphasis, one limitation is that due to the nature of the RoR process, you can't tease out differences by age groups. This could be very important, particularly given that the current generation of infants, toddlers, and preschoolers are the first to be exposed to such a high level of mobile media and interactive devices. More research is desperately needed.
Further, it might be important to discuss that it could take many years before the true impact of modern screen-use behaviours (e.g. media multi-tasking, social media, mobile screen use) is completely understood.

Response: This is a useful point thanks. We already address the limitations of RoRs being dependent on historical literature and the lack of data on multiple screen use – however we have added additional discussion following this in terms of the time-lag before potential impacts of modern digital screen use behaviours are fully understood.

4. it would be interesting to see a bit more discussion around whether we should just be focusing on screen time. Screen use may affect two kids of the same age differently (regardless of content) depending on their temperament, relationships with family members, development e.t.c. Therefore should guidelines just be based on time limits and age ranges? Could recommendations also include indicators that a child isn't coping with the amount of screen time they have??? And do we need to start providing guidelines based on different types of screens? For example, the impacts of video games vs social media vs TV viewing will be very different. Is it time to start thinking of these as separate behaviours?

Response: We recognise the importance of these questions however our RoR was not able to address them. We have included some discussion already on issues of screentime versus content watched versus context in which content are watched on screens – however we feel it important to limit our discussion to the objective findings of the RoR. We have modified our conclusions to note that:

"Any potential limits on screentime must be considered in the light of a lack of understanding of the impact of the content or contexts of digital screen use."

VERSION 2 – REVIEW

REVIEWER	Dr. Leigh Vanderloo Hospital for Sick Children, Toronto, Canada
REVIEW RETURNED	16-Oct-2018

GENERAL COMMENTS	The authors have adequately addressed my comments and concerns.

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REVIEWER	Samantha Marsh University of Auckland, School of Population Health, National Institute for Health Innovation, New Zealand
REVIEW RETURNED	12-Nov-2018

GENERAL COMMENTS	Thank you for addressing the comments raised during the review process.

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