Reviewer’s report

Title: Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: a systematic review, meta-analysis and GRADE of the evidence

Version: 0 Date: 17 Jun 2019

Reviewer: Emily Goldmann

Reviewer's report:

Introduction:

There could be a bit more background provided. It is unclear why sleep and educational performance were included as primary outcomes. They are important, but rationale for including them as mental health outcomes is needed. For example, why not also include other outcomes such as social isolation, physical activity, activity involvement, bullying, etc? It might also be helpful to describe the burden of mental health problems in this population, why it is important to focus on this population from a mental health perspective, and perhaps the increase in these conditions noted in recent years. This information is helpfully provided in the Discussion but should be moved to the Introduction to provide rationale for why this is an important public health issue.

Why the focus on problematic smartphone use vs. smartphone use in general? Has that topic already been reviewed?

How can this review fully shed light on the causal association between PSU and mental health outcomes, given that the large majority of included studies are cross-sectional and that behavioral addictions (e.g., gambling disorder) are often comorbid with other mental health conditions?

The rationale for conducting a systematic review and meta-analysis of this topic needs further development.

Methods:

Did study selection eligibility also require that studies include the primary outcomes (e.g., depression, anxiety)? Or were all studies of PSU included for the first aim, and then studies that happened to also include information on the association between PSU and mental health outcomes then focused on for the second aim? This is a bit unclear. There is mention of inclusion of studies in a "qualitative synthesis" and those included in a "narrative synthesis" in Figure 1, but it unclear how the aims of these syntheses differ. It is then stated in the Results section that 20 studies looked at the relation between PSU and mental health outcomes (the narrative synthesis). This could be clarified in Figure 1 and Methods.
Why only include studies after 1/1/2011? What is significant about 2011 in terms of smartphone technology, particularly given the diversity of geography in the included studies?

Line 150-151: Please clarify what is meant by "A descriptive narrative of PSU as assessed…"

Stress is listed as a primary outcome, but it is unclear what is meant. Perceived stress? Experience of stressors?

Results:

Figure 1 describes two studies identified through other sources (apart from database searches). What were these sources? Were reference sections of selected studies also reviewed? This information could be added to the Methods section. Also, there are three abstracts excluded because they could not be found. Was the full article also unavailable? Why not hold on to these and confirm that they are not eligible during full text review?

In Figure 1, it is unclear what the exposure and outcome are… In Supplementary Table 2, the exposures are listed as phones and outcomes as PSU. I'm not sure I would call cellphones exposures. It's a bit confusing since the second aim of the study looks at the association between PSU (presumably the exposure) and mental health conditions (the outcomes).

When reporting percentages, please keep decimal places consistent.

While interesting, the section on sociodemographic characteristics associated with PSU does not quite tie into the stated aims of the study. Perhaps this can be added as a study aim. It would also helpful to summarize the study populations of the included studies in terms of age, gender distribution, etc.

The mental health outcomes can all be measured in different ways (and are often measured differently across studies). Can the authors please give the reader a sense of how these outcomes were measured (i.e., what screening or diagnostic instruments were used?) in included studies and whether it was fairly consistent across these studies?

For anxiety (line 228), it is stated that seven articles assessed the relation between PSU and this outcome, but only six studies were further assessed?

Studies that examined suicidal ideation and other psychological factors associated with PSU are discussed, but these outcomes were never mentioned specifically as study outcomes. There is also still an indication to co-authors that a citation is needed (line 274).

Discussion:

Given that most studies were cross-sectional and that temporal ambiguity is a serious threat to making causal inferences from these studies, what would the authors suggest in terms of future
research to help move us closer to understanding whether there is a causal relationship between PSU and poor outcomes in this population?

Other:

Figures should have titles that tell the reader what is being shown, and need to be formatted a bit more. It would be helpful to include each mental health outcome in Figure 3. Why focus just on depression here? In general, there is great information in the supplementary material that perhaps could be the focus of figures included in the manuscript itself. For example, I would prefer to see a table of selected articles and their characteristics as opposed to Figure 2, since Figure 2 provides relatively little information, although this may be dependent on what is allowed by the journal.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable
Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests.

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal.