Effectiveness of interventions aimed at reducing screen time in children: a systematic review and meta-analysis of randomized controlled trials

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CRD summary
The review concluded that this meta-analysis did not demonstrate evidence of effectiveness of interventions aimed at reducing screen time in children for reducing body mass index (BMI) and screen time. However, interventions in the preschool age group hold promise. The authors' conclusions may be not reliable in view of the issues of the review methods.

Authors' objectives
To assess the effect of interventions on reducing screen time in children.

Searching
MEDLINE, EMBASE, PsycINFO, ERIC, CINAHL and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from inception to April 2011. Search terms were reported. Clinical trials registries (ClinicalTrials.gov) and relevant conference proceedings (PapersFirst and Proceedings First) were handsearched for unpublished studies. Reference lists of retrieved publications were searched for any additional studies.

Study selection
Randomised controlled trials (RCTs) that evaluated interventions that focused on reducing screen time (television, video games and/or computer use) in children aged 18 years or younger were eligible for inclusion. The primary outcome of interest was body composition as measured by body mass index (BMI). The secondary outcome was amount of screen time as measured by reported hours per week.

Most of the included studies were RCTs of a parallel design and the other studies were cluster RCTs. In the included studies intervention durations ranged from one to 24 months (median six months). The included studies assessed interventions in various settings (such as schools, medical clinics, community centres and community settings). Included studies used different interventions (such as individual counselling, classroom level education and automated monitor controlling screen time). The mean age of participants ranged from 3.9 to 11.7 years. Most of the studies were conducted in USA.

Two reviewers independently assessed studies for inclusion. Any disagreements were resolved through discussion with a third reviewer.

Assessment of study quality
Study quality was assessed using The Cochrane Collaboration checklist. Criteria included sequence generation, concealment of allocation, blinding of participants and outcome assessors and loss to follow-up. An assessment of recruitment bias was conducted for cluster RCTs. GRADE criteria were used to assess of the quality of evidence.

The authors did not report how many reviewers performed quality assessment.

Data extraction
Data were extracted on mean change from baseline in intervention and control groups to enable calculation of difference in mean change between groups with standard errors. Study authors were contacted for additional information where necessary. For studies where results were not reported as the difference in mean change, the authors used the published literature to identify appropriate correlation coefficients to calculate the variance required for this calculation.

Two reviewers independently performed data extraction.

Methods of synthesis
The studies were combined in a meta-analysis. Pooled weighted mean differences (WMDs) with 95% CIs were calculated using a generic inverse method of the random-effects model. Statistical heterogeneity was assessed using the $I^2$ and $X^2$ statistics. Subgroup analyses were conducted on the basis of age (six years and younger versus older than six years).

**Results of the review**

Thirteen RCTs were included in the review (3,133 participants, range 21 to 1,295), five of which were cluster RCTs. Sequence generation was adequate in nine trials. Allocation concealment was adequate in six trials. Blinding was not reported in most trials. Where reported, more than 20% of trial participants were lost to follow-up (two trials). Two of the five cluster RCTs reported adequate recruitment methods. Based on the GRADE score, outcomes of BMI and screen time viewing were judged as low quality evidence.

There was no significant reduction in BMI in the intervention group compared with the control group (WMD -0.10, 95% CI –0.28 to 0.09; six RCTs). No significant difference was found in the amount of screen time as measured by reported hours per week between the two groups (WMD -0.90 hours/week, 95% CI -3.47 to 1.66; nine RCTs). Significant heterogeneity was observed only in the outcome of the amount of screen time ($I^2=66\%$).

Subgroup analysis of preschool children (younger than six years) showed a significant reduction in screen time in the intervention group compared with the control group (WMD -3.72 hours/week, 95% CI -7.23 to -0.20; two RCTs). No significant heterogeneity was observed in this outcome.

**Authors’ conclusions**

This meta-analysis did not demonstrate evidence of effectiveness of interventions aimed at reducing screen time in children for reducing BMI and screen time. Interventions in preschool age group hold promise.

**CRD commentary**

This review’s inclusion criteria were clear. Several relevant databases were searched. Efforts were made to find both published and unpublished studies, which minimised the risk of publication bias. It was unclear whether any language restrictions were applied in the search, which made it difficult to assess the risk of language bias. Attempts were made to minimise errors and biases during study selection and data extraction but it was unclear whether quality assessment was also performed in duplicate. Appropriate criteria were used to assess study quality. However, statistical pooling of the included studies may not have been appropriate given the high degree of heterogeneity in the interventions.

The authors’ conclusions may be not reliable in view of issues of the review methods.

**Implications of the review for practice and research**

**Practice:** The authors did not report any implications for practice.

**Research:** The authors stated that further research with a rigorous design was required to investigate the impact of interventions on reducing screen time in children. Future studies should evaluate pragmatic interventions that can be implemented in fewer sessions over shorter periods of time and have longer follow-up. Studies should focus on key age groups in which behaviour change of children may be sustainable.

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