Media awareness and screen time reduction in children, youth or families: A systematic literature review

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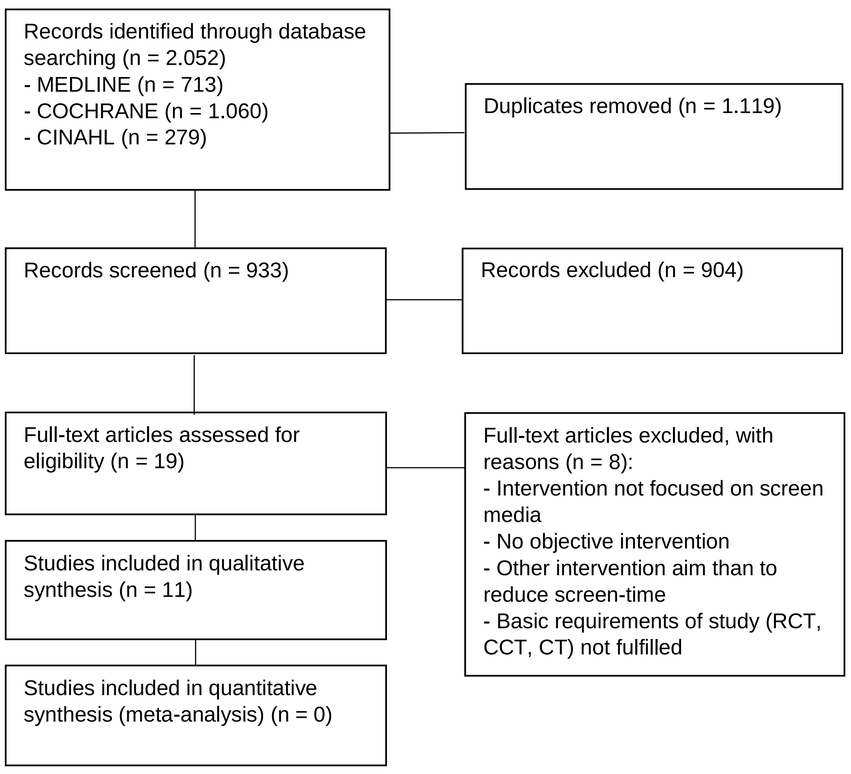
Background and Objective: Excessive use of screen media (screen time) is a global public health issue and especially extensive screen exposure during very early childhood can be harmful for neuro-motor and cognitive development, social competences, mental health and physical wellbeing. Because there is an urgent need to develop and evaluate interventions to reduce screen time, a project group at the Witten/Herdecke University set itself the task to develop innovative scalable multicomponent interventions to reduce screen time, targeting children, youth or families. This review was conducted in order to update previous reviews on the effectiveness of interventions to reduce screen time.

Databases and Data Treatment: An electronic literature search was carried out in the databases MEDLINE, COCHRANE LIBRARY and CINAHL for articles indexed from June 2011 until October 2019. Searches consisted of keywords related to screen-media, intervention and study design. Subsequently, the publications were independently selected and evaluated by two reviewers according to predefined inclusion criteria (Figure 1).

Figure 1: *Flow diagram of study selection*



Results: The search identified 933 publications of which 11 publications were included in this review (Table 1). In 6 studies a significant effect was observed for reduction in screen time. In 1 study participants' intentions to limit their recreational screen time were high and in 1 study children of 1 intervention group were exposed to media for the first time later than in the control group.
No significant differences between intervention and control groups for reduction on screen time were found in 4 studies. Maximum follow-up was 28 months.
No intervention were identified to be superior.

Limitations: Only three databases with terms in English were searched.
On the basis of title and abstract, a high number of publications were excluded.
It is possible that relevant publications were not considered. Due to study heterogeneity in terms of methodologies, outcomes and measurement instruments, carrying out a meta-analysis was not possible. Although we decided to analyze the studies regarding their effect in a qualitative comparison, the different interventions across studies made it difficult to compare findings.
In addition, in a large number of articles the interventions or the control groups were not described very detailed and reproducibly.

Conclusion: There are studies showing interventions with a positive influence on reduction of screen time and the participants' awareness and behavior concerning the use of screen media, as well as studies without such effects. Due to the multimodal nature of most interventions, a direct comparison was not possible. This warrants further investigation of potentially effective single interventions or combinations of components and long-term follow-up.

Table 1: *Study characteristics*

Author, year, design	Sample size, participants, age	Media	Intervention	Duration	Outcome	Results
Bandeira et al., 2019, RCT	1085 students, aged 11–13 and 14–17 years	TV/ video games/ computer	Teacher training, support material for teachers, environmental opportunities to encourage physical activity, health education messages in schools via posters etc.	4 months	Student reported screen time on weekdays and weekends	No significant differences between intervention and control groups for reduction on screen time (boys: 0.105 h/day, 95% CI: −0.184 to 0.393, p = 0.477; girls: −0.065 h/day, 95% CI: −0.383 to 0.252, p = 0.686) and age groups (11–13 years: −0.046 h/day, 95% CI: −0.630 to 0.538, p = 0.878; 14–17 years: 0.193 h/day, 95% CI: −0.077 to 0.464, p = 0.162)
Smith et al., 2017, RCT	361 boys, mean age, 12.7 ± 0.5 years	Screen time in general	Smartphone App "ActiveTeen Leaders Avoiding Screen time" (ATLAS)	18 months	Screen time reported each day of the week	Significant intervention effect was observed for recreational screen time at 8-months (CI = -33 min/d; p = 0.001), which was sustained at 18-months (CI = -27 min/d; p = 0.007).
Babic et al., 2016, RCT	322 students, age unknown	TV/ video/ DVD/ computer / tablet/ smartphone	Interactive seminar, informational and motivational messages via preferred social media and messaging systems	6 months	Adolescents reported mean daily screen time	Significant reductions in screen time were observed in both groups from baseline to posttest (Intervention = -50.5 min/d, p < 0.001; control = -29.2 min/d, p = 0.030). The adjusted between-group difference was not statistically significant (mean = -21.3 min/d; p = 0.255).
Mendoza et al., 2016, RCT	211 children, aged 3–5 years	TV	Fit 5 Kids (F5K) TV reduction curriculum	8 weeks	TV viewing screen time	Significant relative difference for the decrease in mean daily TV viewing minutes −25.3 (95% CI = −45.2, −5.4) for the intervention versus the control group (p = 0.01)
Yilmaz et al., 2015, RCT	363 children, mean age 3.5 ± 1.25 years	TV/ video games/ computer	Printed materials, interactive CD's and 1 counselling call	9 months	Length of screen time of children for 1 week	Significant reduction from baseline in screen time for the control and intervention groups over time (93.96 ± 18.84 / 21.15 ± 6.12/ t = 50.1, p < 0.001)
Andrade et al., 2015, RCT	1370 adolescents, mean age 12.8 ± 0.8 years	TV/ video games/ computer	Individual and environmental oriented strategies i.e. manuscript, textbook, parental workshops	28 months	Adolescents reported screen time on week- and weekend days	While there were partial reduction of screen time in favor to the control group, no constant reduction in screen time was observed in the intervention group over the whole intervention period
Lubans et al., 2014, RCT	361 adolescent boys, mean age, 12.7 ± 0.5 years	Screen time in general	Smartphone App "ActiveTeen Leaders Avoiding Screen time" (ATLAS)	20 weeks	Intention to reduce screen time	Participants' intentions to limit their recreational screen time in percent agreement (mean D 3.95 ± 1.07) were high following the completion of the program
Maddison et al., 2014, RCT	251 children, aged 9–12 years	TV/ video/ computer	Face-to-face counseling of parent/caregiver/ child, activity packages, online support via a website, monthly newsletters	20 weeks	Screen-based sedentary time	No significant differences in screen-based sedentary behavior in intervention and control groups (95% CI −33, −73,7 p = 0.11)
Hesketh et al., 2014, RCT	542 children, ~3-months old	TV	Melbourne InFANT Program (Material and sources to provide knowledge, skills and strategies to promote healthy eating and active play)	17 months	TV viewing screen time	The intervention reduced children's television viewing time (-14.62; 95% CI −28.02, −1.24)
Birken et al., 2012, RCT	351 children, 3-years-old	TV/ video games/ computer	10-minute behavioral counseling intervention by trained study personal directly after the health maintenance visit, which included information on the health impact of screen time in children and provided strategies to decrease screen time	12 months	Parent-reported screen time of children	No significant differences in mean total weekday minutes of screen time (60 minutes, IQR: 35–120 vs. 65 minutes, IQR: 35-120; p = 0.68), or mean total weekend day minutes of screen time (80 minutes, IQR: 45–130 vs. 90 minutes, IQR: 60–120, p = 0.33), between the intervention and control groups
Mendelsohn et al., 2011, RCT	410 families with a child, mean age, 6.9 ± 1,3 months	TV/ video games/ computer	Videotaping of mother-child interaction followed by review with the child development specialist, provision of learning materials, provision of parenting pamphlets, newsletters, learning materials, and parent-completed developmental questionnaires	6 months	Total daily exposure for the child during a 24-hour period	Differences were found across the 2 intervention group and 1 control groups for daily duration of media exposure (min/d 131.6 ±118.7, 151.2 ±116.7), 155.4 ±138.7, p = 0.03). Further children in 1 of 2 intervention groups have been first exposed to media approximately half a month later than children in control groups (p = 0.01)

CI = confidence interval, IQR = interquartile range, SD = standard deviation

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