Impacts of Screen Time, Media and Technology Use on Under 2s during the first 1001 Critical Days: A Systematic Review

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Impacts of Screen Time, Media and Technology Use on Under 2s during the first 1001 Critical Days: A Systematic Review

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Preface

Executive Summary

An Evidence Base of Harms

We have seen through this systematic review that the evidence base is consistent: The benefit of digital screen exposure for babies is negligible, while the potential risks of use on physical, cognitive, social, and emotional development are substantial.

Screen time for the under 2s is now a cultural norm and digital screen devices have pervaded into the family home and even into young children's bedrooms. The available literature shows us that babies', infants' and toddlers' use of digital screens is now a common phenomenon and is excessive. Despite many parents having knowledge of existing guidance from the World Health Organisation (WHO) and the American Academy of Pediatrics (AAP) for under 2s to avoid screen time entirely, caregivers are generally not following this advice, primarily as a result of the busy and demanding lifestyles of parents and the capability of screens to successfully absorb and occupy children's attention. Babies encounter screens in multiple settings, from passive exposure in public and domestic spaces, to active engagement that is even encouraged by some caregivers or professionals. Under 2s can potentially experience digital screens from the moment they wake up, until the point they fall asleep. Learned patterns of harmful screen behaviour can become entrenched as routines, displace rich caregiver interactions, and shape developmental trajectories in ways that persist into later childhood.

Impacts on Children

Evidence shows that screen time in the first two years:

- Displaces physical, gestural, and vocal interaction essential for cognitive, motor, language, social, and emotional development.
- Reduces peer play and outdoor play, weakening physical and social development.
- Increases risk of over-stimulation and cognitive overload.
- Is associated with delayed development measurable years later.
- Has been linked in several studies to increased autism spectrum disorder like symptoms in children with high early exposure.
- Increasingly take on roles traditionally held by caregivers—soothing, entertaining, regulating emotion—potentially weakening attachment and contributing to later social isolation.
- Negatively impacts on sleep.
- Around mealtimes is common and is associated with poorer eating habits.
- Is associated with higher adiposity in later childhood.

- Interrupts or replaces social interaction.
- Occurs repeatedly throughout the day and is a significant driver of developmental risk.
- Used as a coping mechanism for children, increases risk of problematic screen use and emotional reactivity.
- Increases with age.
- Can be mitigated by targeted interventions.

Parents and Caregivers Experiences

Research shows that:

- Parents' own digital habits strongly shape children's media exposure.
- Daily stressors increase maternal technology use, but technology does not effectively reduce stress.
- Technology use rises throughout pregnancy.
- Higher digital engagement—especially social media—is moderately associated with low mood, negative social comparison, and disordered eating behaviours for parents.
- Problematic phone use during pregnancy often does not decline after childbirth.
- Problematic digital use is associated with lower attachment security in parents.

These patterns potentially extend into early parenting, shaping the digital environment babies are born into.

Need for a Professional Response

Further research into the broader impacts of screen time for under 2s is welcome and we have identified a lacuna of studies in this systematic review. However, as an immediate response, of particular note in regard to professional practice, we have seen that there is a lack of coordinated research regarding interventions aimed at reducing screen time for this age group. As a result, we advocate the creation of a *Baby's Screen-Time Risk Assessment* that could be devised to help parents, health visitors and other professionals to identify children potentially at risk and support parents who are concerned about developmental impacts.

A Societal Problem

Screen time for babies, toddlers and infants (the under 2s) is now normal, yet existing evidence is unequivocal: Screen time offers limited developmental benefit, but carries significant, measurable risks.

Reducing exposure requires both individual behaviour change and broader societal shifts that make caregiving feasible without a reliance on digital screens. To help enable this, parents (as role models of normative behaviour) would need to disengage from

screens themselves, yet this is increasingly difficult in a world where digitality is tied to productivity, communication, and identity. Revisiting aspects of analogue efficiencies and the non-digital living of the twentieth century may be necessary and done so before such ways are forgotten by our ageing population. The direction of travel for the safety of the young and for the success of future generations may perhaps be in the encouragement of positive behaviours away from screen use by the under 2s and reenforcing to parents and caregivers the benefits of spending time engaged in non-digital social interaction, physical activity and being outdoors.

Policy Recommendation

No under 2s should receive regular intentional screen time. Passive exposure is societally unavoidable, so adding deliberate use compounds risk without any meaningful benefit. We recommend that any official guidance that may point under 2s towards regular shared screen time, screen time for learning, screen time for communication and/or screen time for children experiencing disabilities/ learning difficulties, should be reconsidered, since it may be misinterpreted by parents and caregivers to indicate safety or even encouragement. This could potentially lead caregivers to believe that screen time for the under 2s is without developmental harm, which may result in an exacerbation of developmental delays and isolating behaviours for those who are already at greater risk.

Research Team and Funding Body

This systematic review has been undertaken by ***iADDICT*** - interdisciplinary Action on Digital Device Immersive Conditions Team who discuss and explore societal opportunities and challenges posed by immersive screen use and advise the implementation of evidence-based guidance garnered through coordinated multi-disciplinary investigations (iADDICT, 2025). The core team members are a diverse group who can be described as multi-ethnic with a balance of genders, ages, social backgrounds and geographies. The team has been drawn together based on their shared belief that answers to the questions challenging screen time researchers, lie within a multi-disciplined approach leading towards inter-disciplinary analysis and outputs. In September 2025, iADDICT responded to the call for tender shared by the ***1001 Critical Days Foundation*** for academics to undertake a systematic review of the impact of screen time in the 1001 critical days of life – from pregnancy to age two. The 1001 Critical Days Foundation is a UK-based international charity who emphasise the importance of the critical period from conception to a child's second birthday, which lays the foundation for lifelong emotional and physical wellbeing.

Introduction

Significant screen time use among adults has become a social norm, not only in the UK but more broadly around the world, with digital device use being self-reported as an essential feature of modern life, as screen technology expands in its ubiquity (Clayton er al., 2022). Screen users often feel compelled or forced to use digital devices and the functional benefits and immersive nature of the user experience, can lead to feelings of dependency and addiction (Aragay, et al., 2024; Bilderback, 2025; Kariya et al., 2025; Khalili-Mahani et al., 2019). Of particular concern and of specific relevance to this systematic review are the health, well-being, developmental and cultural impacts of caregivers' screen dependency behaviours upon children (Li et al., 2022), and how excessive screen use may be becoming normative for families. In the UK, the Government's digital strategy (Department for Science, Innovation & Technology/DSIT, 2025; Department for Culture, Media & Sport/DCMS, 2022) is accelerating the integration of screen use further across society, with similar patterns of Government policy seen around the world. For children under 2 years old, the ubiquity of digital devices means that there will be inevitable intersections between those experiencing their formative first 1001 critical days of life and the digital world, primarily through screen technologies.

The first 1001 days of life are a crucial stage in establishing the foundations of a child's physical and mental health (Burlingham et al., 2024), and this period has strong implications on the child's ability to engage in future opportunities (Darling et al., 2020; His Majesty's/HM Government, 2021). Academics and policy makers can face challenges when researching this early age group and so often, babies and toddlers' experiences may become invisible as a focus of attention is placed more generically on the under 5s. Since the developmental stage up until the age of 2 has been documented as being a period of unique significance in the long-term outcomes of a person, it is important that this 'baby blind spot' in terms of infant screen use is addressed. As such, there is a pressing need for the development of evidence-based knowledge in this area that can hopefully lead to stronger and clearer guidance (iADDICT, 2025). With the ageing population of people who have experience of living without digital devices is declining (Age UK, 2024), the time for robust research to be undertaken is now. This research is not just about the children, but also about the parents and caregivers and how their lived experience and behaviours may shape those of their babies.

Previous Relevant Systematic/Scoping Reviews

Prior to undertaking this systematic review, the iADDICT team catalogued and studied the range of existing systematic and scoping reviews (SRs) in this area across different disciplines over the past fifteen years. Whilst previous SRs have generated value to the ongoing debates regarding screen time, we have found that they are often limited by a narrow thematic focus that situates their findings within a single academic discipline. Most also cover a wider age range, and do not represent the entirety of the 1001 critical days. The list of SRs is as follows:

Braune-Krickau, K., Schneebeli, L., Pehlke-Milde, J., Gemperle, M., Koch, R. and von Wyl, A. (2021) 'Smartphones in the nursery: Parental smartphone use and parental sensitivity and responsiveness within parent–child interaction in early childhood (0–5 years): A scoping review', *Infant Mental Health Journal*, 42(2), pp.161–175. Available at: https://pubmed.ncbi.nlm.nih.gov/33452702/

Duch, H., Fisher, E.M., Ensari, I. and Harrington, A. (2013) 'Screen time use in children under 3 years old: A systematic review of correlates', *International Journal of Behavioral Nutrition and Physical Activity*, 10, p.102. Available at: https://doi.org/10.1186/1479-5868-10-102

Early Years Screen Time Advisory Group (2026) *EYSTAG report: Rapid scoping review of systematic reviews*. Available at: https://assets.publishing.service.gov.uk/media/69c53daf4a06660f085442a7/EYSTAG_report.pdf

Fiorinelli, M., Di Mario, S., Surace, A., Mattei, M., Russo, C., Villa, G., Dionisi, S., Di Simone, E. and Di Muzio, M. (2021) 'Smartphone distraction during nursing care: Systematic literature review', *Applied Nursing Research*, 58, p.151405.

Lee, S., Kim, D. and Shin, Y. (2024) 'Screen time among preschoolers: Exploring individual, familial, and environmental factors', *Clinical and Experimental Pediatrics*, 67(12), p.641. Available at: https://pubmed.ncbi.nlm.nih.gov/39265626/

Rega, V., Gioia, F. and Boursier, V. (2023) 'Problematic media use among children up to the age of 10: A systematic literature review', *International Journal of Environmental Research and Public Health*, 20(10), p.5854. Available at: https://doi.org/10.3390/ijerph20105854

Sticca, F. et al. (2025) 'Screen on = development off? A systematic scoping review and a developmental psychology perspective on the effects of screen time on early childhood development', *Frontiers in Developmental Psychology*. Available at: https://doi.org/10.3389/fdpys.2024.1439040

Stiglic, N. and Viner, R.M. (2019) 'Effects of screen time on the health and well-being of children and adolescents: A systematic review of reviews', *BMJ Open*, 9(1), e023191. Available at: https://doi.org/10.1136/bmjopen-2018-023191

Toledo-Vargas, M., Chong, K.H., Maddren, C.I., Howard, S.J., Wakefield, B. and Okely, A.D. (2025) 'Parental technology use in a child's presence and health and development in the early years: A systematic review and meta-analysis', *JAMA Pediatrics*, 179(7), pp.730–737. Available at: https://doi.org/10.1001/jamapediatrics.2025.0682

Veldman, S.L.C., Altenburg, T.M., Chinapaw, M.J.M. and Gubbels, J.S. (2023) 'Correlates of screen time in the early years (0–5 years): A systematic review', *Preventive Medicine Reports*, 33, p.102214. Available at: https://doi.org/10.1016/j.pmedr.2023.102214

Zahedi, S., Jaffer, R. and Iyer, A. (2021) 'A systematic review of screen-time literature to inform educational policy and practice during COVID-19', *International Journal of Educational Research Open*, 2, p.100094. Available at: https://doi.org/10.1016/j.ijedro.2021.100094

Since no single academic discipline can address the complexities of screen time on its own, we feel these reviews, whilst being robust and diligently prepared within subject specific boundaries, have insufficiently moved understanding forward to the point of creating an interdisciplinary platform upon which evidenced-based research can be built. It is therefore essential that a multidisciplinary approach is now conducted, in order to unify academic progress in a cohesive and functional direction. No systematic review has taken our proposed approach and focus before.

Methodology

Protocol

The systematic review protocol was preregistered in PROSPERO (CRD: CRD420261283693) prior to initiation of the systematic review process (20th January 2026).

Eligibility Criteria

The following criteria were used to assess eligibility:

1.1) The study examined or measured general digital media use. This includes the following specific devices (and its synonyms): smartphone, tablet, computer, gaming console, television. It also covers general terms for digital media use (e.g., technology use, screen time) and specific activities (e.g., social media, streaming). 'General' use specifically refers to normative (e.g., Haverson et al., 2025), non-specific and everyday usage of technology/devices.

1.2) Studies that focused on technology use for a specific purpose (e.g., to assess the efficacy of a digital health application) were deemed out of scope.

2.1) Studies in which the study population comprised women who participated during pregnancy (i.e., the purpose of the study was to sample pregnant women).

2.2) Studies in which the primary study population is children aged from 0 to 2, pertaining to the child's technology use. This includes studies in which parents/caregivers respond with their evaluations of a child aged 0-2. Although the 1001 critical days finishes at the second birthday, we included studies where the average or maximum age of the child is 2 years old. The age of the child was determined using the following criteria, in order: a) if the study specified it sampled children/parents of children aged 2 or younger (i.e., the range), b) descriptive statistics.

2.3) Studies in which the primary study population is parents of children aged from 0 to 2, pertaining to the parent's technology use. This includes studies in which the parent is the primary target population and the study focuses on their interactions with a child aged 0-2 (e.g., phubbing, technoference).

3.1) The paper reports the findings of empirical research. This includes cross-sectional observational (e.g., questionnaires, retrospective analysis of records), studies, qualitative and mixed methods investigations, and longitudinal studies (i.e., birth cohorts, randomized interventions, observational studies).

3.2) Non-empirical studies will be excluded. This includes evidence syntheses (i.e., narrative reviews, scoping reviews, systematic reviews, meta-analyses, theoretical

papers), case studies, conference abstract and papers, commentaries (i.e., editorials, commentaries, opinion pieces), and analyses of media.

4) The study had been published after 1st January 2020. Records were extracted from inception, but for the purpose of this review report, only records from 2020 onwards were included.

Because of the lack of research on ocular health, which was anticipated, research discussed in the systematic review includes data from older children.

Search Strategy and Searches

Bibliographic searches were undertaken using two databases (Web of Science, and Scopus) on 23rd January 2026 (Web of Science) and 30th January 2026 (Scopus). Search terms were developed to capture the breadth of possible terms that are relevant to technology use during the 1001 critical days and potential outcomes. The search terms and searches are reported in Table 1.

Table 1: Groups of terms entered together for the bibliographic database searches (denoted by letters), and the specific searches conducted (denoted by numbers).

N	Type	Terms (separated by OR operators)
A	Device	"screen time", screentime, "screen exposure", "screen view*", "screen use", "screen usage", "media use", "media usage", "media time", "media view*", "technology use", "technology usage", browsing, watching, "app use", "digital media", "digital device", "electronic media", handheld, touchscreen, "touch screen", phubb*, technoference, "social media", "internet use", "internet usage", smartphone, "smart phone", "mobile phone", "cell phone", "cellular phone", cellphone, tablet, gaming, "video games", "computer games", console, "computer use", "computer usage", television
B	Population	"in utero", foetus, fetus, baby, babies, child*, infant*, infancy, toddler, "early child*", "early year", preschool*, "under 3", "under 2", perinatal, newborn, pediatric*, paediatric*, pregnant, pregnancy, childbirth, birth, antenatal, parent*, postnatal, family, caregiver, carer, guardian, mother*, father*, mum, data, grandparent*, nursery, childminder
C	Physical – Eye Health	"digital eye strain", "dry eye disease", ocular, "Meibomian gland disease", "Meibomian gland dysfunction", "tear instability", "tear volume reduction", "gland damage", "image clarity", "unnatural lighting", myopia, "eye health",

D	Physical	“computer vision syndrome”, asthenopia, “ocular surface disease”, accommodation, vergence, convergence lethargy, inactivity, headache*, sleep, “physical activity”, movement, “neck pain”, “text neck”, pain, neurological, “lipid profile”, obesity, weight, sedentary, lethargi*
E	Psychological – Problematic Usage	addiction, “problematic use”, “problematic usage”, “excessive use”, “excessive usage”, “harmful use”, “harmful usage”, “inappropriate use”, “inappropriate usage”, “compulsive use”, “compulsive usage”, addicted, nomophobia
F	Psychological	externali?ing, internali?ing, behavio?r, mood, depression, anxiety, stress, distress, attention, impulsivity, aggress*, violen*, cogniti*, concentrat*, distract*, emotion*, personality, withdrawal, temperament*
G	Relationships	relations*, interactions, interpersonal, “social exclusion”, copresen*, responsive, attentive, neglect*, safety, displacement, communication, bond*, connection*, intimacy, closeness, cohesion, conflict, isolation, argument*, separation, attachment, discipline, eating, “family time”, holiday*, outing*, leisure, social, abandon*
H	Development	movement, sociali?ation, language, communication, speaking, hearing, hygiene, development*, delay*, motor, adjustment, adjusted, autist*, executive, function*, learning, regulation

	Searches – using the topic (TS =) operator for Web of Science, and TITLE-ABS-KEY for Scopus
1	A AND B AND C
2	A AND B AND D
3	A AND B AND E
4	A AND B AND F
5	A AND B AND G
6	A AND B AND H

Screening

Results were extracted from the two databases as machine readable files (Web of Science as an .xls Excel Spreadsheet, Scopus as a .csv file). The files were processed using *R* (v. 4.5). First, the files from each of the searches conducted on Web of Science were merged. Because Web of Science allows 1000 results to be extracted at a time, these were combined to a total of 6 data frames (for each search). Results in each data frame were assigned a unique ID number. Then, the eight data frames were collapsed into a single data frame, using Web of Science’s unique record identifier to exclude duplicates of records that appeared in multiple search results.

Preliminary screening was undertaken on this combined data frame. Results that were not published in a peer reviewed journal, not written in English, and not designated as 'Articles' (i.e., excluding other types including corrections, theses, letters, reviews, conference abstracts and proceedings) were flagged and excluded at this point.

For Scopus, this process was repeated. The only difference was that the records from Scopus did not have a clear designation regarding whether the record was from a peer reviewed journal. Instead, because results from Scopus were extracted after Web of Science, core identifiers (article title, DOI number, PubMed ID) were used to identify duplicate records).

Because the number of records returned was very large, screening was organised by subdividing results into 16 categories (eye health, addiction, and all permutations of other physical, other psychological, relationships, and development), which were assigned across the research team.

Screening took place on a shared Excel spreadsheet hosted on OneDrive, with a unique ID for each record. The spreadsheet included bibliographic information about the paper, keywords, and the abstract. Coders were asked to record whether the record was clearly excluded (red), included (green), or ambiguous requiring further consultation (amber). Ambiguous results included cases where it was unclear if the technology use was in scope, or the age of the participant was not clear from the abstract. These were adjudicated by discussion between the research team and accessing full texts to determine if further information could be extracted that informed whether the study met the inclusion criteria for this review.

Data Extraction

Data extraction was undertaken by the research team using a questionnaire developed in Qualtrics. The form requested coders provide bibliographic information about the paper, study information (when and where the study took place), type of data collected (i.e., qualitative, quantitative, mixed methods, then broken down into questionnaire, interview, observations etc.), sampling information (sampling approach, inclusion/exclusion criteria), core inclusion groups included in the study, descriptive statistics, types of technology use measured, how technology use was measured and findings regarding technology use, the study's key findings, limitations, and recommendations.

Data Synthesis and Analysis

Data synthesis was conducted by bringing together the different themes by the type of outcome that technology use was being investigated upon: cultural, physical, psychological, and relational impacts.

Results

What follows, are the results from the systematic review. We have brought together available and appropriate data from all disciplines and used thematic analysis to group results into the following areas: Cultural Impacts, Physical Impacts, Psychological Impacts and Relational Impacts.

For each section there are subsequent subsections that have been identified for closer analysis. For each subsection there will be an analytical discussion written in prose followed by a table of results.

Cultural Impacts

Screen Time as a Norm for Under 2s

Screen time has become a normative part of early childhood, that is increasingly centred on smartphones rather than traditional television and shaped heavily by the pressures and routines of modern family life (Chakhunashvili and Chakhunashvili, 2025; Luvira and Photichai, 2025; Pizzi et al., 2025; Yue et al., 2025). As a result, most families do not follow the recommendations of the World Health Organization or the American Academy of Pediatrics, which advise no screen exposure before age two and a maximum of one hour per day for children aged two to four (Alroqi et al., 2021; Brushe et al., 2023; Cartanyà-Hueso et al., 2021; Pizzi et al., 2025; Wentz et al., 2022). Screen time is 'freely available' to children under the age of two (Prioreschi et al., 2020), who are now using screens at levels that far exceed current health guidance (Alroqi et al., 2021; Brushe et al., 2023; Cartanyà-Hueso et al., 2021; Yue et al., 2025), despite parental awareness of guidelines (Amaral de Andrade Leão et al., 2025; Li et al., 2022; Lin et al., 2020; Mota et al., 2024; Wang et al., 2023).

By 24 months, daily screen use is nearly universal, exceeding recommended limits (Almeida et al., 2025; Dikkala et al., 2022; Mekhail et al., 2024), often occurring in contexts of limited parental interaction (Ribner and McHarg, 2021). A small but significant group—around 9.5%—show persistently high use at the age of two, averaging about four hours per day (McArthur et al., 2020). Notably, around 20% of children use screens with no parental interaction at all (Dikkala et al., 2022; Ribner and McHarg, 2021). A major driver of early screen exposure is parental workload. Caregivers balancing employment, household responsibilities, and fatigue often rely on screens to occupy children, with screens acting as 'babysitters' (Bar Lev and Elias, 2020). Individual circumstances can significantly increase this reliance (Bar Lev and Elias, 2020; Dikkala et al., 2022; Luvira and Photichai, 2025; Ribner and McHarg, 2021).

Table 2: Studies identified in the systematic review that are relevant for cultural impact of screens in children aged 0-2 and normative use

Author (year)	**Country**	**Participants (n)**	**Age range/group**	**Outcome**	**Findings**
Almeida et al. (2025)	Brazil	267	0–3 years (0–12, 13–24, 25–36 months)	Maternal symptoms of common mental disorders (CMD) and health orientation	Maternal mental health symptoms were associated with greater child digital media use, particularly during the first year of life. This may reflect reduced caregiver engagement and increased reliance on digital media during early parent–child interactions.
Alroqi et al. (2021)	Saudi Arabia	85	1–3 years (M = 24.9 months, SD = 7.7)	Language development	Average screen time approx. 3 hours per day.
Amaral de Andrade Leão et al. (2025)	Brazil	Age 2 (n=1,420), Age 4 (n=3,963), Age 6–7 (n=3,857)	2, 4, and 6-7 years (longitudinal study)	Screen use patterns	Children are exceeding current screen time guidelines, with different patterns of use according to child/family characteristics. The high use of screens and more concentrated use during the evenings raise concern considering its possible negative effects on health.
Bar Lev and Elias (2020)	Israel	10	3–24 months	Parental media use in routines; infant screen exposure;	Parents used media as background ‘babysitter,' 'pacifier,' and 'childcare toolkit.'

				role of media in caregiving	
Brushe et al. (2023)	Australia	220	0–2 years	Adult words, child vocalisations, conversational turns	At six months, children were exposed to an average of 1hr, 16 min (SD = 1hr, 36 min) of screens per day, increasing to an average of 2 h, 28 min (SD = 2 h, 4 min) by 24-months. Some children at six months were exposed to more than 3 hr of screen time per day.
Brushe et al. (2024)	Australia	220	0–2 years	Parent–child talk (adult words, child vocalisations, conversational turns)	Increases in screen time were associated with decreases in measures of parent-child talk. The largest decreases were seen at 36 months, when an additional minute of screen time was associated with a reduction of 6.6 adult words, 4.9 child vocalizations, and 1.1 conversational turns.
Cartanyà-Hueso et al. (2021)	Spain	313	0-2 years	Exposure to smartphones and tablets	During COVID-19 confinement, three out of four children from 12-47 months were exposed to smartphones and tablets daily. Exposure during mealtimes and before bedtime was associated with longer device use.
Chakhunashvili and Chakhunashvili (2025)	Georgia	646	16–30 months (mean age not reported)	Risk of autism spectrum disorder (M-CHAT-R scores)	Majority of parents do not adhere to the World Health Organization (WHO) or American Academy of Pediatrics (APP) recommendations regarding screen time exposure.

Devi et al. (2022)	Fiji	379	12-24 months	Screen viewing	Screen-viewing was more prevalent in children aged 12–24 months (89%) than in children below 12 months (57%). The risk of screen-viewing was high among those who had parents as daytime caregivers and children younger than 12 months.
Dikkala et al. (2022)	India	80	9–36 months (majority 12–24)	ASD/autistic traits	The majority of toddlers (36.2%) were screen viewing for approx. 1–2 hours per day; 30% of the sample had 2–4 hours of screen time daily, and 21.2% experienced more than 4 hours of screen media exposure.
Diler and Baskale (2022)	Türkiye	304	6-36 months (29.3% 13-24 months, 21.7% 6-12 months old)	Screen time and sleep patterns	The most frequently used screen type in all of the age groups and parents was TV, followed by smartphones. As the age of the children increased, the rate of all screen-type uses also increased.
Durham et al. (2021)	Germany	630	12 months	Exposure to digital media	45% of children had already been exposed to digital media by their first birthday. The most frequent first digital media exposure was the TV (33.0%) followed by smartphones (16.9%), both most commonly exposed to around the age of 8 months. On a regular weekday, 20% of the children spent 0.5-1 hours in front of a TV and 9% were exposed to a smartphone for the same

					time frame, compared to 31% of joint parent-child media use.
Gago-Galvagno et al. (2024)	Argentina	1878	12–48 months (M = 27.55, SD = 9.68)	Early cognitive skills (language and motor development)	Caregivers reported that their toddlers were exposed to TV, background TV, and cell phones for more than one hour per day with different content types.
Kahn, et al. (2021c)	United States of America/ USA	1518	1 to 18 months	Sleep patterns affected by COVID	Infant screen time rose by 18.3 min per day for older infants, but remained stable for younger infants, with increased sleep duration and starting earlier, but increased parent-reported sleep-onset latency and nocturnal wakefulness.
Kracht et al. (2023)	USA	89	3, 12 and 24 months	Growth and development	Screen time increased between 12 and 24 months and was positively associated with fat mass index and negatively associated with development scores.
Li et al. (2022)	China	953	1-5 years (cohort study)	Daily screen time and outdoor time	High proportions of young Chinese children had more screen time than the AAP recommendations. Children's average screen time increased at 18-36 months and decreased at 42-54 months, with a slight increase at 60 months.

Lin et al. (2020)	Taiwan	161	18-36 months (M = 25.63, SD = 5.35)	Behaviour; Communication and Language	Higher levels of touch screen device usage showed significant associations with emotional problems, anxious/depressive symptoms, somatic complaints, social withdrawal symptoms, attention problems, and aggressive behaviours, but not language delay, in children aged 18–36 months.
Luvira & Photichai (2025)	Thailand	247	18 months	Electronic media exposure	52.2% of 18-month-old children were raised with the assistance of electronic media. Mothers reported using electronic media to support child-rearing. Media use was associated with family characteristics such as marital status, unemployment, and household size.
McArthur et al. (2020)	Canada	1949	24, 36, 60 months	Behaviour and learning outcomes	Persistent high screen use was associated with higher externalising behaviours, poorer adaptive skills, and reduced likelihood of achieving developmental milestones at 60 months.
Mekhail et al. (2024)	Sweden	386	15–18 months	Screen use habits and parental reflections	92.4% of children used screens by the age of 15-18 months, commonly for a maximum of 30 mins per day.
Mota et al. 2025	Brazil	144	12–35 months	Sleep duration and screen time	Toddlers' average screen time exceeded 1.5 hr per day. Only 21% of the assessed toddlers complied with the overall 24-hr movement

					behaviour guidelines, mainly due to low adherence to screen time recommendations.
Nyberg et al. (2025)	Sweden	1828 (1078 aged 18 months and 750 aged 4 years)	18 months	Physical activity (PA), sedentary time and screen time	Among 18-month-old children, 22% met screen time guidelines on weekdays and 17% on weekends.
Pizzi et al. (2025)	Italy	35,550	0–2 years	Screen exposure	39.2% of children aged 2-15 months were exposed to digital screens. The exposure prevalence increased with age, ranging from 13.9% at 2-3 months to 61.9% at 13-15 months.
Prioreschi et al (2020)	South Africa	19	0-2 years	Mothers' perception and promotion of play and physical activity	Screen time was freely available to children.
Quah et al. (2024)	Singapore	901	0-6 years	Children's adherence to the Singapore Integrated 24-Hour Activity Guidelines	Among toddlers with an average age of 2 years old, there was a decline in overall adherence to activity guidelines compared to infants, possibly attributed to the reduced adherence to physical activity and screen time guidelines.
Risica et al. (2022)	USA	221	2 years and under	Food and activity environments for infants and	Screen time was observed in FCCH, but not in centres.

				toddlers in childcare centres and family childcare homes (FCCH)	
Ribner and McHarg (2021)	USA/UK	303	4, 14, 24 months	Predictors of media use	Children spend more time engaging with digital media as they grow older; however, growth mixture models reveal most children fit into one of two classes: One group of children (High Media Users; 52.2%) engages with a substantial amount of digital media, whereas the other (Low Media Users; 48.8%) engages with relatively little.
Slobodin et al. (2024)	Israel	179	6, 12, 24 months	Motor and language development	Screen exposure at 6 and 12 months was associated with increased risk of language/communication deficits at 36 months in moderate/high SES groups, but not low SES groups.
Wang et al. (2023)	China	3355	0-23 months (grouped by age: 0-5 months, 6-11 months, and 12-23 months)	Children's movement behaviour practices and caregivers' movement	Less than half of the children met recommendations in physical activity time (PAT) (19.2%), physical restraint (PR) (45.8%), and screen time (ST) (46.4%) during the last 24 hours. PAT, outdoor time (OT), and sleep duration (SD) in children aged 0-5 months were significantly lower than in the other two age

				behaviour knowledge	groups. ST was significantly higher than in the other two age groups during the last 24 hours.
Wentz et al. (2022)	USA	193	18 months and under	Maternal attitudes	Seventy-nine percent of the infants in this study exceeded daily screen media recommendations.
Yue et al. (2025)	China	1,825	4–29 months (longitudinal)	Developmental outcomes (cognitive and non-cognitive)	70% of children in this age group have been exposed to screen. Among children aged 2 and above, 54% surpass the recommended daily limit of one hour of screen time set by the World Health Organization.

Screen Time Increases with Age

Screen use increases steadily with age. More than half of children are already using screens by 12 months, and over a third are exposed as early as six months (Brushe et al., 2023, Bar Lev and Elias, 2020; Gago Galvagno et al., 2024; McArthur et al., 2020). Screen viewing becomes more prevalent (Devi et al., 2022, Diler and Baskale, 2022) and increases in duration from age 12-24 months compared to under 12 months (Quah et al., 2021). As children progress from infants to toddlers, they are less likely to meet guidelines for screen viewing and physical activity (Quah et al., 2021). Infant screen time rose by 18.3 min per day for older infants, but remained stable for younger infants (Kahn et al., 2021c), whereas in a study in the USA, screen time increased from (0.42±1.3 to 0.85±1.2 hours/day between 12-months and 24-months (Kracht et al., 2023). Global estimates vary widely, from just a few minutes per day to as much as three hours (Dikkala et al., 2022; Luvira and Photichai, 2025; Mekhail et al., 2024; Slobodin et al., 2024), with some international comparisons demonstrating substantial variability across cultural and socioeconomic contexts (Almeida et al., 2025; Gago Galvagno et al., 2024). In some studies, infants under six months are reported to receive around 1.5 hours of screen exposure daily, rising to roughly 2.5 hours or even 4 hours by 24 months (Brushe et al., 2024; McArthur et al., 2020; Wentz et al., 2022) and children may spend up to an hour in a single sitting, highlighting concerns about prolonged, uninterrupted exposure (Luvira and Photichai, 2025).

Table 3: Studies included in the systematic review looking at screen time and age

Author (year)	Country	Participants (n)	Age range/ group	Outcome	Findings
Bar Lev and Elias (2020)	Israel	10	3–24 months	Parental media use in routines; infant screen exposure; role of media in caregiving	Parents used media as background 'babysitter,' 'pacifier,' and 'childcare toolkit.'
Brushe et al. (2023)	Australia	220	0–2 years	Children's screen exposure over an average day	At six months, children were exposed to an average of 1hr, 16 min (SD = 1hr, 36 min) of screens per day, increasing to an average of 2 hr, 28 min (SD = 2 hr, 4 min) by 24-months. Some children at six months were exposed to more than 3 hr of screen time per day.
Brushe et al. (2024)	Australia	220	0–2 years	Parent–child talk (adult words, child vocalisations, conversational turns)	Increases in screen time were associated with decreases in measures of parent-child talk. The largest decreases were seen at 36 months, when an additional minute of screen time was associated with a reduction of 6.6 adult words, 4.9 child vocalizations, and 1.1 conversational turns.
Chakhunashvili and	Georgia	646	16–30 months (mean age	Risk of autism spectrum disorder (M-CHAT-R scores)	Majority of parents do not adhere to the World Health Organization or American Academy of

Chakhunashvili (2025)			not reported)		Pediatrics recommendations regarding screen time exposure.
Devi et al. (2022)	Fiji	379	12-24 months	Screen viewing	Screen-viewing was more prevalent in children aged 12–24 months (89%) than in children below 12 months (57%). The risk of screen-viewing was high among those who had parents as daytime caregivers and children younger than 12 months.
Durham et al. (2021)	Germany	630	12 months	Exposure to digital media	45% of children had already been exposed to digital media by their first birthday. The most frequent first digital media exposure was the TV (33.0%) followed by smartphones (16.9%), both most commonly exposed to around the age of 8 months. On a regular weekday, 20% of the children spent 0.5-1 h in front of a TV and 9% were exposed to a smartphone for the same time frame, compared to 31% of joint parent-child media use.
Dikkala et al. (2022)	India	80	9–36 months (majority 12–24)	ASD/autistic traits	The majority of the toddlers (36.2%) were screen viewing for about 1–2 hours per day; 30% of the sample had 2–4 hours of screen time daily, and 21.2% experienced more than 4 hours of screen media exposure.

Diler and Baskale (2022)	Türkiye	304	6-36 months (29.3% 13-24 months, 21.7% 6-12 months old)	Screen time and sleep patterns	The most frequently used screen type in all of the age groups and parents was TV, followed by smartphones. As the age of the children increased, the rate of all screen-type use also increased.
Gago-Galvagno et al. (2024)	Argentina	1878	12–48 months (M = 27.55, SD = 9.68)	Early cognitive skills (language and motor development)	Caregivers reported that their toddlers were exposed to TV, background TV, and cell phones for more than one hour per day with different content types. Television, background TV, and mobile phone exposure were negatively associated with language and motor development. Book use and shared media were positively associated with language outcomes; findings for computers and tablets were mixed.
Kahn, et al. (2021c)	USA	1518	1-18 months	Sleep patterns affected by COVID	Infant screen time rose by 18.3 min per day for older infants, but remained stable for younger infants, with increased sleep duration and starting earlier, but increased parent-reported sleep-onset latency and nocturnal wakefulness.

Kracht et al. (2023)	USA	89	3, 12 and 24 months	Growth and development	Screen time increased between 12 and 24 months and was positively associated with fat mass index and negatively associated with development scores.
Luvira and Photichai (2025)	Thailand	247	18 months	Electronic media exposure	52.2% of 18-month-old children were raised with the assistance of electronic media. Mothers reported using electronic media to support child-rearing. Media use was associated with family characteristics such as marital status, unemployment, and household size.
McArthur et al. (2020)	Canada	1949	24, 36, 60 months	Behaviour and learning outcomes	Persistent high screen use was associated with higher externalising behaviours, poorer adaptive skills, and reduced likelihood of achieving developmental milestones at 60 months.
Mekhail et al. (2024)	Sweden	386	15–18 months	Screen use habits and parental reflections	92.4% of children used screens by the age of 15-18 months, commonly for a maximum of 30 mins per day. Age, sex, and parental education were associated with children's physical activity and screen time, suggesting targeted interventions.

Nyberg et al. (2025)	Sweden	1828 (1078 aged 18 months, 750 aged 4 years)	18 months	Physical activity (PA), sedentary time and screen time	Among 18-month-old children, 22% met screen time guidelines on weekdays and 17% on weekends.
Quah et al. (2024)	Singapore	901	0-6 years	Children's adherence to the Singapore Integrated 24-Hour Activity Guidelines	Among toddlers with an average age of 2 years old, there was a decline in overall adherence to activity guidelines compared to infants, possibly attributed to the reduced adherence to physical activity and screen time guidelines.
Pizzi et al. (2025)	Italy	35,550	0–2 years	Screen exposure	Most infants, particularly from lower SES backgrounds, were exposed to screens during a critical developmental period, potentially disrupting responsive caregiving and early development.
Risica et al. (2022)	USA	221	2 years and under	Food and activity environments for infants and toddlers in childcare centres and family childcare homes (FCCH)	Screen time was observed in FCCH, but not in centres.
Slobodin et al. (2024)	Israel	179	6, 12, 24 months	Motor and language development	Screen exposure at 6 and 12 months was associated with increased risk of language/communication deficits at 36 months in moderate/high SES (socioeconomic) groups, but not low SES groups.

Intersectional Differences

Recent evidence demonstrates that early-childhood screen exposure is patterned by intersecting sociodemographic, cultural, and parental factors. For example, one US study indicates that non-Hispanic Black caregivers of one-year-old children report markedly higher levels of both passive (approximately 124 minutes more per day) and active (approximately 37 minutes more per day) television use than some others (Gorecki et al., 2023). Ethnic variation is also observed in UK cohorts, where children of foreign-born South Asian British mothers exhibit a higher likelihood of television exposure during mealtimes (Kwon et al., 2023), with variations between migrated families and other groups also being observed in Italy by Pizzi et al. (2025).

Determinants of elevated screen use have been identified in several contexts. Among Malay families, higher child screen time is associated with parental age ≥30 years, parental screen use exceeding two hours per day and perceptions of screen media's cognitive benefits (Raj et al., 2022). Broader health behaviour frameworks reinforce these disparities: Racially diverse, low-income children in the United States demonstrate low adherence to the 5-2-1-0 guideline, indicating cumulative disadvantage across diet, physical activity, and media exposure domains (Mahabee-Gittens et al., 2021). International comparative studies further reveal substantial variability in screen-time practices across cultural and socioeconomic settings (Almeida et al., 2025; Gago Galvagno et al., 2024).

Among the literature, a consistent finding emerges: parental educational attainment exerts an influence on both the quantity and structure of children's media use (Krogh et al., 2021; Melchior et al., 2022, Paulus et al., 2024). Higher educational levels of parents are repeatedly associated with lower overall exposure, greater adherence to guidance, and more intentional or regulated patterns of screen engagement (Brushe et al., 2023; 2024; Pizzi et al., 2025). Lower maternal educational attainment is associated with increased television viewing and poorer dietary profiles among girls (Saldanha-Gomes et al., 2020), whereas higher parental education and the presence of more siblings correlate with reduced screen exposure and longer infant sleep duration (Zhang et al., 2022). Parents with higher education levels are more likely to report that their children meet recommended screen-time thresholds across both weekdays and weekends (Nyberg et al., 2025).

Table 4: Studies included in the systematic review that look at intersectional differences in technology use

Author (year)	Country	Participants (n)	Age range/group	Outcome	Findings
Almeida et al. (2025)	Brazil	267	0–3 years (0–12, 13–24, 25–36 months)	Maternal symptoms of common mental disorders (CMD) and health orientation	Children's digital media use in Brazil is a multifactorial and system-based phenomenon, influenced by maternal mental health and broader contextual factors, and cannot be explained through simple linear relationships.
Brushe et al. (2023)	Australia	220	0–2 years	Adult words, child vocalisations, conversational turns	Children from higher educated families were exposed to 1hr,43 min fewer screens per day, 95%CI (-2hr, 13 min, -1hr, 11 min) compared to lower educated households, with this difference remaining consistent as children age. Girls were exposed to an additional 12 min of screens 95%CI (−20 min, 44 min) per day compared to boys at six months, but this difference reduced to only 5 min by 24-months.
Brushe et al. (2024)	Australia	220	0–2 years	Three measures of parent-child talk: adult words, child vocalizations, conversational turns	Higher screen time linked to reduced adult words, child vocalisations, and conversational turns. A negative association between screen time and parent-child talk became clear, highlighting the important role that maternal educational level, child sex, primary caregiver's psychological distress, and number of home activities play.

Gago-Galvagno et al. (2024)	Argentina	1878	12–48 months (M = 27.55, SD = 9.68)	Early cognitive skills (language and motor development)	On average, toddlers engaged for 1 hr per day with TV and were passive recipients of background TV for 2 hr a day, which was the most used screen. For SES/ socioeconomic status, having at least one basic need unsatisfied or less parental educational and occupancy was related with more background TV and use, less time sharing this type of media with toddlers, and less use and quantity of books at home.
Gorecki et al. (2023)	USA	235	12 months	Feeding, television, and sleep behaviours	Non-Hispanic Black caregivers were less likely to report exclusive bottle use, reported 2.4 ounces more juice, 124 min more passive television time, and 37 min more active television time.
Krogh et al. (2021)	Denmark	2015	2, 4, 7, and 11 months (longitudinal study)	Screen time, technoference and maternal sociodemographic factors	The mean amount of screen time in infants aged 2–11 months was 6−17 min a day. Technoference in mother-infant interactions happened on average, 5–6 times a day. Maternal educational level was negatively related to infant screen time.
Kwon et al. (2023)	UK	1149	24 and 36 months (assessed at both ages)	Parenting practices and TV viewing behaviours	More frequent exposure to TV at mealtimes and South Asian ethnicity were associated with higher TV viewing time at 24 and 36 months of age among children.
Mahabee-Gittens et al. (2021)	USA	401	>6 months-5 years old (M= 2.4, SD=1.6 years)	Sociodemographic, '5-2-1-0' behaviours, BMI, and cotinine-confirmed TSE/ tobacco smoke exposure	The '5-2-1-0' guidelines recommend that children: eat ≥5 servings of fruits/vegetables ('5'), have ≤2 hours of screen-time ('2'), have ≥1 hour of activity ('1'), and drink 0 sugar-sweetened beverages ('0')

					daily. Racially diverse, low-income children with TSE had low '5-2-1-0' attainment. Interventions are needed to improve lifestyle habits in this population.
Melchior et al. (2022)	France	12,950	Children aged 2 years	Risk of autism spectrum disorder (ASD) / neurodevelopmental outcomes	Low levels of screen use among children at high risk of neurodevelopmental difficulties suggest limited interest or specific parental behaviours in some – rather highly educated – families which restrict children's exposure.
Nyberg et al. (2025)	Sweden	1828 (1078 aged 18 months and 750 aged 4 years)	18 months	Physical activity (PA), sedentary time and screen time	Among 18-month-old children, 22% met screen time guidelines on weekdays and 17% on weekends. More children whose parents were highly educated participated in organised activities and used active transport modes; they also had lower screen time than children whose parents had low education.
Paulus et al. (2024)	Germany	3035	0-3 years (M = 17.37 months, SD = 13.68)	Socio-demographics, on child media use, and on parental media use	Family factors, including higher maternal media use, problematic internet use, and lower educational attainment (e.g., lower school graduation), were significantly associated with greater digital media use in young children.
Pizzi et al. (2025)	Italy	35,550	0–2 years	Screen exposure	Screen exposure was significantly more frequent among children of mothers with non-Italian citizenship, having lower levels of education, reporting economic difficulties, non-participation in antenatal classes (ACs), and residing in the center-south.

Raj et al. (2022)	Malaysia	489	Aged 5 and under (40% were aged 2 and under and 60% aged 2 to below 5 years)	Prevalence and determinants of excessive screen time	Most children utilized television (66%), followed by handheld devices (30%) and computers (4%). Determinants of screen time identified were Malay ethnicity, parental age of ≥30 years, parental screen time >2 h a day, moderate self-efficacy to influence a child's physical activity and the positive perception on the influence of screen time on a child's cognitive wellbeing.
Saldanha-Gomes et al. (2021)	France	1903	2 years	Food, sleep, anthropometry	A higher score on the 'Processed and fast foods' dietary pattern was associated with a greater likelihood of very early adiposity rebound (AR) (OR = 1.23; 95% CI: 1.00–1.50). In contrast, no significant associations were found between the 'Nutrient-dense foods' dietary pattern, TV/DVD viewing, or time spent playing outdoors and the timing of AR/ adiposity rebound.
Zhang et al. (2022)	Canada	411	0-2 years	Sleep time, reading time, siblings	Infant age was associated with all movement behaviours except for restrained time. White infants and those with older parents had less tummy time but increased odds of having reading time. Infants of the most educated parents also had lower tummy time. Higher parental education and more siblings were associated with no screen time and longer infant sleep time. Infants with immigrant parent(s) were less likely to have reading time. No associations

					were found for infant sex, time spent in nonparental care, and parental marital status.

The Parent/Caregiver Experience

Screen use has become deeply embedded in everyday parenting routines, through smartphone use (Luvira and Photichai, 2025), television (Pizzi et al., 2025), and increasingly tablet use (Gago Galvagno et al., 2025). The integration of screens into daily caregiving practices has accelerated since the COVID-19 pandemic, which normalised and increased reliance on digital media in early childhood (Chakhunashvili and Chakhunashvili, 2025; McArthur et al., 2020). Screen viewing increases at weekends (Diler and Baskale, 2022, Nyberg et al., 2025), which can partly be explained by acknowledging that screen time and availability varies by setting, e.g. more common in children's homes than care settings (Risica et al., 2022). Family TV time is a strong predictor of infant screen time (Durham et al., 2021).

Stress, Mental Health and Mood

The research literature looking at the impact of technology use on parenting has focused on social media and smartphones. Several common themes emerged, such as the impact of technological distractions on their own wellbeing, use of technology to manage stress situations, worries about attachment, and social comparisons with other people on social media.

Several studies focused on the widespread use of technology for coping (Koire et al., 2024; Schneebeli et al., 2025; Williams et al., 2025; Wolfers et al., 2023a; Zurcher et al., 2020). Use of technology to cope with stressful events was common: 62% of recent mothers were engaged in virtual support groups (e.g., social media) (Koire et al., 2024), and 29% of daily ecological momentary assessments from mothers of infants reported phone use to cope with a stressful situation (Wolfers et al., 2023a). Each of these studies found that a stressor (e.g., difficult infant temperament, stressors in general, executive dysfunction) led to increased media use or problematic use. Two of these studies (Wolfers et al., 2023; Zurcher et al., 2020) found direct evidence that this type of motivated technology use was not particularly effective overall, either in terms of the participants' own report of efficacy in reducing stress, or that it led to other negative outcomes (i.e., technoference).

Some of the studies looked at the topic of coping, and whilst provided insights into the area, did not directly assess overall efficacy. Koire et al. (2024) found that women using virtual support groups were more likely to use social media to cope with loneliness but identified limited evidence for its efficacy. However, this study did not test the most relevant effect, i.e., correlations between use of social media for coping with loneliness, perceived effectiveness of coping, and distress. Williams et al. (2025) found that media use was a common method of stress management during the pandemic (61% of mothers reported watching TV/movies as a strategy, 47% social media, and 17% used Zoom), and that social support was associated with reduced distress, but did not compare between strategies. These highlight how frequently technology is used to cope

with stressful events, but at the same time do not directly look at whether it was successful.

One theme that emerged was about the risks and benefits of navigating and sharing information in online spaces, particularly via social media. Data taken from scraped posts of new mothers (Zhang et al., 2020) found that posting was frequent and included pictures of their children. Although most of the research has focused on the impacts of social media on the health and wellbeing of parents and children, there is also a cluster of studies looking at potential harms from disclosing too much or inappropriate information about their child (Briazu et al., 2021). This also aligns with the literature on 'sharenting', that has explored the potential dangers with some of these behaviours. Briazu and colleagues (2021) investigated mothers' experiences on Facebook, and their concerns about sharing information (e.g., photos, updates) of their child. Although around one in five mothers reported a negative experience on Facebook, and a similar proportion feeling regret about information they had shared, these were not widely reflected as concerns about sharenting on Facebook. Instead, the most prominent concerns centred around safeguarding (e.g., inappropriate use, abduction). Qualitative research has highlighted the ambivalent experiences of new parents on social media (e.g., Hall et al., 2023), with digital surveillance occurring from personal (e.g., social comparison, reassurance seeking), interpersonal (judgement from family) and systemic (e.g., healthcare providers) frames.

Table 5: Studies included in the systematic review centred around the parent/caregiver experience

Author (Year)	Country	Participants (n)	Age	Outcomes	Findings
Ahmadiniyatabes et al. (2023)	Iran	280 mothers	0-6 months	Technoference	Maternal distractions during feeding and interaction are mostly related to phone use.
Apostolopoulos et al. (2021)	Australia	20 post-partum mothers	12-36 weeks	Themes from qualitative interview	Mixture of individual, social and environmental influences impacted physical activity, but only individual and social for screen time. Common sets of strategies to intervene on both (in-person social activities, tracking apps, awareness raising).
Arumugam et al. (2025)	Malaysia	100 parents	Children aged 15-42 months	Problematic use	Successfully developed a parental measure of media addiction.
Briazu et al. (2021)	UK	190 mothers	0-3 (M = 1years)	Online safety	Facebook posting varied. 90% posted photos of their child on FB. 17% have had a negative experience, and 18.4% shared something they then regretted. Parents appeared to underweight sharenting risks (privacy, emotional harm, identity theft) and overweight safeguarding concerns.
Campos et al. (2023)	Brazil	139 parents	0-2 years	Distress, burnout	Screen time higher in children aged 12m +, particularly due to TV/watching activities. Increases in motivations from parental needs, children's preference, to support education and family routine. Screen use was skewed (mean = 131 mins, median = 32 mins). Higher screen time associated with worsening feelings of burnout and distress.
Chakhunashvili and Chakhunashvili (2025)	Georgia	646	16–30 months (mean	Risk of autism spectrum disorder (M-CHAT-R scores)	Majority of parents do not adhere to the World Health Organization or American Academy of Pediatrics recommendations regarding screen time exposure.

			age not reported)		
Cosottile (2022)	USA	51 parent-child dyads	0-5 (M = 2.5) years	Technoference	Distractions (phone and pen/paper) reduced vigilance and tended to be worse in pen/paper compared to phone. Distraction more important than medium.
Cowderoy et al. (2020)	Australia	158 mothers	6 months	Depression	Average screen exposure around 30-40 mins. No relationship with maternal depression.
Davis et al. (2022)	USA	374 mothers	2-6 months	Temperament, technoference	Maternal distraction linked with higher negative affectivity, and lower orienting/regulatory capacity. This was moderated by age – stronger effects for younger children with negative affectivity, older children for orienting/regulatory capacity.
Diler and Baskale (2022)	Türkiye	304	6-36 months (29.3% 13-24 months, 21.7% 6-12 months old)	Screen time and sleep patterns	The most frequently used screen type in all of the age groups and parents was TV, followed by smartphones. As the age of the children increased, the rate of all screen-type use also increased.
Facca et al. (2023)	Canada	26 mothers	0-2 years	Habit, social comparison	Four themes emerged, highlighting ambivalence in transition to parenthood – first theme (balancing tensions) focused on tech disrupting parent time, mirroring of tech behaviours (e.g., swiping) by infants. Second theme focused on social comparison. The third and fourth themes focused on informational content, and how it could either improve or worsen prenatal attachment.

Gago-Galvagno et al. (2024)	Argentina	1878	12–48 months (M = 27.55, SD = 9.68)	Early cognitive skills (language and motor development)	Caregivers reported that their toddlers were exposed to TV, background TV, and cell phones for more than one hour per day with different content types. Television, background TV, and mobile phone exposure were negatively associated with language and motor development. Book use and shared media were positively associated with language outcomes; findings for computers and tablets were mixed.
Glatz et al. (2023)	Sweden	422 parents	0-5 years (M = 1.29)	Depression, stress, social comparison, self-efficacy	Parents felt more positive than negative when comparing their parenting to others on social media. Positive feelings were associated with higher self-efficacy, whilst negative feelings were linked with lower self-efficacy, and higher depression and parenting stress.
Gow et al. (2025)	Australia	308 mothers	0-2 years	Body image, social comparison	RCT – no effect of body or health related imagery that might trigger social comparison on body image or state social comparison.
Gutierrez (2021)	USA	332 mothers	0-6 months	Attachment	Higher tech use by mothers associated with insecure perceptions of parent-infant attachment. Limited evidence of mediation by infant temperament.
Hall et al. (2023)	Canada	26 mothers	0-2 years	Social comparison	Three themes emerged, around self-surveillance of tech use (i.e., challenging own intuition, reassurance seeking, social comparison), interpersonal surveillance (from friends, family and feelings of judgement), and systemic surveillance (i.e., comparison and norms from professionals).
Inoue et al. (2021)	Japan	195 post-partum mothers	~ 1-3 months (W1), 6-10	Questionnaires about phone use during feeding	Smartphone use during breastfeeding is habitual and prevalent but doesn't affect parent-child bonding.

			months (W2)		
Inoue et al. (2022)	Japan	13 mother-infant dyads	2-6 months	Attachment, technoference	Phone use was distracting and interfered with responding to infant's bids for attention. However, little evidence of effects on quality and bonding in interactions.
Kerr et al. (2025)	USA	401 parents	1-2 years	Burnout, coping, temperament	Overall, media use seemed to be an adaptive, short-term coping strategy. Motivated by burnout and regulating difficult child behaviours.
Kirkpatrick et al. (2022)	USA	464 mothers	0-3 years	Social comparison, anxiety	Quasi-experiment testing exposure to idealized and non-idealised, and everyday vs influencer portrayals of mothers on social media. Non-idealised portrayals led to greater social comparison and were beneficial. Idealised portrayals led to fewer comparisons, but the ones that did were negative.
Koire et al. (2024)	USA	383 postpartum mothers	0-6 months	Coping, depression, anxiety	Majority of women in sample used some form of virtual support group. Women using these groups tended to use social media to alleviate loneliness, but limited evidence of efficacy.
Konrad et al. (2021)	Germany	54 mother-infant dyads	20-22 months	Technoference, attachment	Interruptions led to decrease in maternal responsiveness and pedagogical behaviour, and increases in positive and negative bids for attention, negative affect (albeit from v. low base) and toy engagement. Prohibited behaviours increased through task.
Linder et al. (2021)	USA	248 parents	11 – 26 months	Attachment, problematic use	Parental absorption in media predicted attachment insecurity.
Luvira and Photichai (2025)	Thailand	247	18 months	Electronic media exposure	52.2% of 18-month-old children were raised with the assistance of electronic media. Mothers reported using electronic media to support child-rearing. Media use was associated with family characteristics such as marital status, unemployment, and household size.

McArthur et al. (2020)	Canada	1949	24, 36, 60 months	Behaviour and learning outcomes	Persistent high screen use was associated with higher externalising behaviours, poorer adaptive skills, and reduced likelihood of achieving developmental milestones at 60 months.
McDaniel et al. (2023)	USA	268 parents of infants	~ 6 months	Problematic use, behaviour change	Fairly low levels of behaviour change endorsed – contemplators (85%) reported higher bedtime media, social media use, and perceived PSU compared to pre-contemplators (15%).
McDaniel et al. (2025)	USA	183 mother-father dyads	0-5 years (mean = 2 years)	Technoference, stress	Parents spend more time texting than on social media, than on gaming. Mothers tended to use social media more, fathers gamed more. Parenting stress was correlated with gaming and social media based technoference.
Nomkin et al. (2021)	Israel	20 mothers and babies	~ 3-6 months	Problematic use (PMU-SF)	Mothers looked at their child less during the breastfeeding than the face-to-face phase. Electrodermal activity correlated with phone use during breastfeeding, and smartphone addiction.
Nyberg et al. (2025)	Sweden	1828 (1078 aged 18 months, 750 aged 4 years)	18 months	Physical activity (PA), sedentary time and screen time	Among 18-month-old children, 22% met screen time guidelines on weekdays and 17% on weekends.
Pizzi et al. (2025)	Italy	35,550	0–2 years	Screen exposure	Most infants, particularly from lower SES backgrounds, were exposed to screens during a critical developmental period, potentially disrupting responsive caregiving and early development.
Risica et al. (2022)	USA	221	2 years and under	Food and activity environments for infants and toddlers in childcare centres	Screen time was observed in FCCH, but not in centres.

				and family childcare homes (FCCH)	
Onishi et al. (2024)	Japan	429 parents	0-3 years	Depression, anxiety, loneliness	Effects of social media use on distress were only found in interaction with loneliness.
Sabha et al. (2022)	Saudi Arabia	284 parents	Children 0-4 years, median < 2 years	Problematic use, attachment	Parental IA associated with perceived insecure attachment.
Schneebeli et al. (2025)	Switzerland	261 parents of 142 children	~ 1.25 years	Problematic use (SAS-SV), temperament, stress	There was a mediating relationship between difficult child temperament, stress, and parental PSU.
Shin et al. (2021)	USA	296 mothers	18-36 months	Temperament (effortful control and negative affectivity), parenting stress (PSI-SF)	Higher negative affectivity and lower effortful control associated with child screen media use. Both mediated by maternal parenting stress.
Williams et al. (2025)	USA	252 mothers	~ 1 year	Coping, depression, anxiety	Technology use was one of multiple ways in which women coped with stress. Did not formally evaluate different types, but coping overall effective.
Wolfers et al. (2023a)	Germany	218 mothers	Youngest child aged 18 months	Problematic use, stress, coping	Phone use in stressful situations common. Using phones for coping was linked with cognitive salience of the phone and the relevance to the stressor. Limited effectiveness as a coping strategy.
Wolfers et al. (2023b)	Germany	158 mothers	0-6 (M = 1.75) years	Coping, stress	Findings showed that injunctive norms about phone use increased situational guilt about phone use, which in turn reduced coping efficacy and role satisfaction.

Zhang et al. (2020)	China	419 mothers	0-6 weeks	Depression, anxiety, sleep quality	Engagement with social media (WeChat) was high (average 0.9 posts per day). Data scraped from social media accounts identified most photos posted of people (especially their child) and objects. Selfie posting associated with depression.
Zurcher et al. (2020)	USA	341 mother-father dyads	0-1 years	Problematic use, technoference, executive function	Difficulties with executive function linked with media use in mothers and fathers, which in turn associated with technoference.

Screen Media Use During Pregnancy

Technology use was pervasive across the studies reviewed. Most estimates put internet and mobile phone use as the most intensive, with estimates of 3-5 hours per day of use (e.g., Bingol et al., 2024; McDaniel et al., 2023; Yang et al., 2024). Social media, although frequently included within these, was typically lower, with users reporting to spend 1-2 hours per day (Muskens et al., 2023; Sanli et al., 2025) (one study reported 3.5 hours per day). Longitudinal studies monitoring use during pregnancy found that usage increased as pregnancy progressed (Muskens et al., 2023; 2024; Wade-Bohlever et al., 2024).

Most of the studies focusing on pregnant women examined the relationship between (problematic/non-problematic) technology use and depression or anxiety, typically finding moderate associations between greater tech use and low mood (Bingol et al., 2024; Guo et al., 2025; Kiyak et al., 2024; Ma et al., 2024; Muskens et al., 2023; Samra et al., 2024; Sanli et al., 2025; Smith et al., 2020; Wade-Bohleber et al., 2024; Wang et al., 2023; Yang et al., 2024; Yildirim et al., 2022; Zeeni et al., 2023; Zhou et al., 2021). One study (Zeeni et al., 2023) found that overall social media use was not associated with distress, but that frequency of posting was associated with body image concerns and potentially harmful social comparison behaviours. Two studies (Smith et al., 2020; Yang et al., 2022) looked at quality of life, identifying similar effects that are likely to be driven by low mood.

However, it is important to note that most studies examined in this review excluded pregnant women with psychiatric disorders as part of their inclusion criteria. This means that it is not clear whether these effects extend to very high levels of mood disorder, or if there are specific difficulties or experiences in other psychiatric conditions that have been missed. Several studies, particularly in the United States, additionally highlighted that they oversampled from educated, affluent populations, who may be more conscious about technology use and aware of the messaging about potential risks.

Three studies looked at the relationship between device use and prenatal attachment i.e., between the expectant mother and foetus (Hood et al., 2022; Sanli et al., 2025; Smith et al., 2020). None of these found an association between technology use and attachment, which contrasts with the literature from parents and their newborns. One qualitative study (Hood et al., 2022) found that most of the pregnant women interviewed had not considered it as a particular concern. When given time to elaborate, only a quarter expressed predominantly negative views (mostly around information worrying them), and most (75%) being indifferent or positive, seeing information as a way to connect with their child.

There was ample evidence that increased technology use in pregnant women is motivated by needs associated with pregnancy. Levels of technology (especially social

media) use for seeking information about pregnancy and childbirth, engaging with pregnancy-related communities, following pregnancy/childbirth related accounts and influencers, support seeking, and coping about anxieties around pregnancy/childbirth were commonly reported in these studies (Bingol et al., 2024; Lee and Lee 2022; Li et al., 2020). Moreover, there was limited evidence that expectant mothers were not especially concerned about their own use (Constantino et al., 2023).

Nonetheless, several studies explored potential concerns around social media, specifically looking at disordered eating behaviours (Calpbinici, 2025; Loo et al., 2022; Samra et al., 2024; Zeeni et al., 2023) and/or negative social comparisons (i.e., with peers, influencers) (Samra et al., 2024; Wang et al., 2023). These themes both extend into parenthood as well. These have tended to find that higher intensity of social media use are associated with unhealthy or disordered eating patterns (e.g., orthorexia), and a tendency to engage in negative comparisons with content on social media. One study (Loo et al., 2022) found no effect of media use (TV and screens) on the tendency to skip, delay or other irregular mealtime behaviours.

One theme that emerged from both pregnant women and new parents was on the efficacy of media use for coping. Three studies (Bingol et al., 2024; Ma et al., 2022; Zhou et al., 2023) found links between media use or problematic use, and coping based themes (e.g., pregnancy stress, severe COVID restrictions, childbirth anxieties). As the literature with parents also appears to suggest, coping motives appear to be associated with worse outcomes, but there is also limited evidence that media use as a coping mechanism appears to be effective at mitigating the stressor as well.

In short, the reasons for engaging with social media appear constructive and purposeful. Some of these uses may be more beneficial than others; there is a semi-critical literature on 'momfluencers' and online communities that raises concerns about social media behaviours and the risk of misinformation. The research that has looked at coping motivations suggests that this is associated with lower wellbeing, which is consistent with the wider literature on problematic use as well. There is also limited evidence that such coping mechanisms are effective.

Table 6: Studies included the systematic review that examined technology use during pregnancy

Author (year)	Country	Participants (n)	Period	Outcome	Findings
Bingol et al. (2024)	Türkiye	3870 pregnant women	Prenatal	Problematic use, anxiety	PSU (NMP) was correlated with childbirth related fears.
Bozan et al. (2023)	Türkiye	500 pregnant women	Prenatal	Problematic use	Both social media use and PSMU are prevalent in pregnant women.
Calpbinici (2025)	Türkiye	200 pregnant women	Prenatal	Disordered eating	Social media use integration was associated with orthorexia (excessive or obsessive healthy eating tendencies).
Constantino et al. (2023)	Italy	237 pregnant women	Prenatal	Problematic use, RF exposure	Concerns about phone use were low and hadn't changed during pregnancy. Using a self-developed addiction scale (take with caution), 99.2% were defined as having some form of PSU.
Guo et al. (2025)	China	972 pregnant women	Prenatal	Anxiety, depression	Greater phone use, greater bedtime use and different types of use associated with anxiety.
Hood et al. (2022)	Australia	27 pregnant women	Prenatal	Attachment	Pregnant women reported frequent mobile device use. Most hadn't considered tech use as impacting prenatal attachment. 25% maintained that after discussion, 25% reached negative evaluation (distraction, habit, information seeking causing fear), and 50% positive (information searching increasing closeness and connectedness).
Kiyak et al. (2024)	Türkiye	257 pregnant women	Prenatal	Problematic use, sleep, depression	Association between PSU and sleep disturbances mediated by depression.
Ku et al. (2022)	Singapore	299 pregnant women	Prenatal	Sleep, eating, distress	Screen time (>1h) at night before bed was not associated with poor sleep quality or sleep problems in general. Nocturnal eating and light exposure were between 2 and 4am.

Lee et al. (2022)	South Korea	302 pregnant women	Prenatal	Coping	Most pregnant women (72.8% used social media. Non-users tended to seek out less information across the board in general with pregnancy stage (e.g., fewer antenatal/pregnancy topics post-partum) affecting topics searched for. All frequency measures more frequent in postpartum. Reasons for using social media for this were led by speed, and emotional and informational relevance of the content.
Li et al. (2020)	China	387 pregnant women	Prenatal	Problematic use, attitudes, health risks	Findings consistent with theory of planned behaviour.
Loo et al. (2022)	Singapore	90 pregnant women	Prenatal	Eating behaviour	Screen time not associated with irregular meal behaviour.
Ma et al. (2024)	China	342 pregnant women	Prenatal	Problematic use, stress, self-efficacy	PSU increase during pregnancy and was correlated with pregnancy stress and low self-efficacy.
Muskens et al. (2023)	Netherlands	697 pregnant women	Prenatal	Problematic use, depression	Trajectories of more severe depression associated with greater PSMU.
Muskens et al. (2024)	Netherlands	1135 pregnant women	Prenatal	Problematic use	Volume, frequency and problematic social media use increased during pregnancy.
Samra et al. (2024)	Australia	225 pregnant women	Prenatal	Problematic use, depression, anxiety, body image, social comparison, eating disorder	PSMU associated depression, anxiety and disorder eating in pregnant women. Associations are mediated by poor body image and negative social comparisons.

Sanli et al. (2025)	Türkiye	277 pregnant women	Prenatal	Problematic use, stress, attachment	Social media usage prevalent, PSMU moderate. PSMU and pregnancy stress correlated.
Sato et al. (2023)	Japan	238 pregnant women	Prenatal	Problematic use	Half of women gamed during pregnancy, IGD scores very low. Women who gamed increased gaming during pregnancy.
Smith et al. (2020)	Australia	48 pregnant women	Prenatal	Depression, quality of life, attachment	Digital media use was correlated with negative affect, self-criticism, and poorer quality of life, but not prenatal attachment.
Sobol et al. (2025)	Poland	30 pregnant women and partners	Prenatal	Problematic use, depression	Partner's PSMU associated with pregnant women's depression and fatalism.
Wade-Bohleber et al. (2024)	Switzerland	94 mother-father-child triads	Prenatal	Problematic use, technoference	Little change from perinatal to postnatal period. Mothers rated partners as experiencing more technoference. Impulsivity, anxiety, and difficult temperament associated with PSU.
Wang et al. (2023)	China	2661 pregnant women	Prenatal	Depression, social comparison	Measures of social media use were weakly correlated with rumination and antenatal depression. Were correlated with upward social comparison via WeChat. Evidence of mediation from attitudes towards social interaction on WeChat -> upward social comparison on WeChat -> rumination -> depression.
Yang et al. (2022)	China	1060 pregnant women	Prenatal	Problematic use, quality of life	Prevalence of IA in pregnant women was 30.19%, and items about requesting time to spend longer online a bridging node between IA and QoL.
Yang et al. (2024)	China	665 pregnant women	Prenatal	Problematic use, depression	SA, phone use, TV use, and phone use before bed associated with depression.
Yildirim et al. (2022)	Türkiye	203 pregnant women	Prenatal	Depression, anxiety, stress	Frequent social media use associated with higher scores on depression, stress, and anxiety. This was attributed to high levels of misinformation.

Zeeni et al. (2023)	Lebanon	192 pregnant women	Prenatal	Body image, disordered eating	Social media usage correlated with healthier dietary behaviours, SM posting with negative body image attitudes, concerns about postnatal image, competitive attitudes about postnatal weight loss, and positive dietary behaviours. Anxiety/dependence associated with negative body image attitudes, anxiety around postnatal body image, and positive dietary behaviours.
Zhou et al. (2021)	China	1266 pregnant women	Prenatal	Depression	Internet use mediated the relationship between strength of lockdown policy and depression.

Physical Impacts

Adiposity

Several studies indicate a positive association between screen time and increased adiposity or overweight status in young children and children who use screens during mealtimes are significantly more likely to show obesity-related growth patterns (Putnick et al., 2023). For instance, in a large cohort study, Azab et al. (2025) found that screen time was independently associated with adiposity measured by skinfold thicknesses in children aged 0 to 3 years in Canada and the UK (Azab et al., 2025). Similarly, Padmapriya et al. (2021) reported that greater screen-viewing and handheld device time at ages 2 and 3 were linked to higher abdominal adiposity measured by MRI at 4.5 years in Singaporean children (Padmapriya et al., 2021). Contrastingly, Saldanha-Gomes et al. (2022) found no significant association between TV/DVD watching and the age of adiposity rebound (considered a risk factor for later obesity) in French children (Saldanha-Gomes et al., 2022). Other studies from Indonesia, the USA, and Türkiye also linked screen exposure to overweight status, increased weight, and body mass index, highlighting associated factors such as maternal education and the presence of media devices in bedrooms (Kracht et al., 2023; Ma et al. 2025; Mutlu and Dinleyici 2024; Saito and Kondo 2023). Part of the issue may be linked with parents watching television or mobile device use during mealtimes, as this was associated with when their child felt satisfied and the parent noticing this (Ventura et al., 2023). A lack of mobility when using screens may explain why Hotta et al. (2025) identified in a very large longitudinal cohort that TV/DVD screen exposure at age 1 year was associated with an increased risk of chronic constipation by age 3, with risk increasing alongside exposure duration in a large Japanese cohort (Hotta et al., 2025).

Screen time is associated with poor health-related lifestyle habits. Saldanha-Gomes et al. (2020) identified clusters of girls with very high TV exposure and unfavorable mealtime habits at the age of 2 years who exhibited the highest body fat compared to those that had formed more health habits (including less screen time) at 5 years despite high outdoor activity. This concept of high screen time in young children being part of a cluster of unhealthy lifestyle ‘choices’ was supported by the work of Krijger et al. (2023) who found that high intake of sugar-sweetened beverages correlated with high screen time in Dutch toddlers.

Sleep

Multiple studies from Indonesia, the USA, Australia, and Türkiye highlight the disruptive effects of screen exposure on sleep in infants and toddlers. For example, Lestari and colleagues (2020) found strong associations between parental electronic device use and infant sleep disorders. Kahn et al. (2021a) observed increased infant screen time during COVID-19 with altered sleep patterns, including increased sleep duration, but

also longer sleep-onset latency and nocturnal wakefulness. The time children devoted to sleep is directly proportional to the time they devoted to physical activity and indirectly proportional to the time they spent watching screens (Cachon-Zagalaz et al., 2021). Screens are commonly located in young children's rooms (Metlu and Dinleyici, 2024) and more devices located in the child's room and the more time spent watching TV or using an iPad/smartphone is associated with less hours of sleep at night / going to sleep later at night (Ballagamba et al., 2021).

More touch screen device usage is also associated with less sleep (Joseph et al., 2022). By 18 months children have developed more touchscreen appropriate behaviours compared to at 10 months, potentially as a result of haptic exploration (Ziemer et al., 2021). It has also been observed that a shift in an understanding of touchscreen affordances occurs between 10 and 15 months (Ziemer et al., 2021). Higher infant touch screen use and higher maternal touch screen use associated with poorer infant development (Beynon et al., 2024). Touchscreen exposure was linked to decreased daytime sleep compensated by increased nighttime sleep, whereas TV exposure had less impact (Kahn et al., 2021b). Media devices in children's bedrooms affected sleep duration and patterns, and TV viewing as well as being associated with higher BMI in children over two years old (Mutlu and Dinleyici, 2024).

Table 7: Studies included in the systematic review that examined the effects of technology on physical health aspects including adiposity, diet, and sleep

Author (year)	Country	Participants (n)	Age range	Health Outcome	Findings
Azab et al. (2025)	Canada / UK	3,171	0 to 3 years	Adiposity assessed from subscapular and triceps skinfold thicknesses	Screen time independently associated with adiposity.
Gath et al. (2026)	New Zealand	6,281	Screen exposure at 2 to 4.5 years with development at 4.5 and 8 years	Language development, early educational skills and peer social functioning	Higher levels of screen exposure associated with lower levels of vocabulary, communication, writing, numeracy and letter fluency, and higher levels of peer problems. >1.5 hr of daily direct screen time at age 2 associated with below average language and educational ability and above average levels of peer relationship problems at age 4.5. >2.5 hr of daily direct screen time associated with higher than average peer relationship problems at age 8.
Golds et al. (2025)	UK	450	3 to 9 months	Infant social-emotional development	Maternal smartphone use during critical periods of parenting all demonstrate a

					negative association with mother-infant responsiveness.
Hesketh and Dodd (2023)	UK	319	2 years	Mental health	Higher educational (but not reported recreational) screen time associated with poorer mental health.
Hotta et al. (2025)	Japan	63,697	Screen use at 1 year with risk at 3 years	Chronic constipation	TV/DED screen exposure at age 1 year associated with risk of chronic constipation at age 3, increasing with exposure time.
Kahn et al. (2021a)	USA	1518	1 to 18 months	Sleep patterns affected by COVID	Infant screen time rose by 18.3 min per day for older infants, but remained stable for younger infants, with increased sleep duration and starting earlier, but increased parent-reported sleep-onset latency and nocturnal wakefulness.
Kahn et al. (2021b)	Australia	1074	0 to 18 months	Sleep patterns	Touch-screen exposure associated with decreased daytime sleep, but with a proposed compensatory increase in nighttime sleep, whereas television exposure less related.
Kim and Chung (2021)	Korea	1087	Screen use at 5.5 months to 87.9 months	Language, cognitive development	Negative association found between greater TV time and children's language, cognitive development.
Kracht et al. (2023)	USA	89	3, 12 and 24 months	Growth and development	Screen time increased between 12 and 24 months and was positively associated

					with fat mass index and negatively associated with development scores.
Krijger et al. (2023)	Netherlands	646	1 to 3 years	Lifestyle clusters	A high intake of sugar-sweetened beverages was associated with high screen time.
Lestari et al. (2020)	Indonesia	112	3 to 6 months	Sleep disorders	Sleep disorders in infants associated with parental use of electronic devices (OR 156.2, correlation r = 0.839).
Ma et al. (2025)	USA	143	2 month screen viewing and 6 month growth	Obesogenic risk behaviours and infant weight	Television on in room where the infant sleeps and parents using a cell phone or television while child playing associated with increased weight.
Mutlu and Dinleyici (2024)	Türkiye	731	2 to 59 months	Sleep patterns and body mass	Television viewing periods associated with body mass index of children older than two years old and presence of media devices in children's bedrooms impacts sleep duration and patterns throughout both nighttime and daytime.
Padmapriya et al. (2021)	Singapore	307	Screen-viewing time at 2 and 3 years with adiposity at 4.5 years.	Adiposity (abdominal) measured by magnetic resonance imaging	Greater screen-viewing and handheld device time (not TV viewing) associated with higher superficial and deep subcutaneous (not visceral) adipose tissue volumes.

Saito and Kondo (2023)	Indonesia	110	0 to 2 years	Overweight	Mother's education (tertiary), employment type (fulltime), watching television (more than 1 h) associated with their child being overweight.
Saldanha-Gomes et al. (2020)	France	1436 and 1195	2 and 5 years respectively	Health related habit clusters	Girls in cluster defined by very high TV exposure and unfavourable mealtime habits (despite high outdoor playing and walking time) had highest body fat.
Saldanha-Gomes et al. (2022)	France	1138	2 years screen viewing	Age of adiposity rebound, an established risk factor for later obesity	No significant association of age of adiposity rebound with TV/DVD watching.
Sim et al. (2025)	Australia	221-450	Screen use at 1 year with behaviour and development at 3 years	Behaviour and development	Maternal and child screen use were not significantly with behavioural and developmental outcomes. More maternal TV screen use and less maternal mobile/tablet screen use were associated with some poorer child outcomes. More child TV screen use but not mobile/tablet screen use was related to poorer behavioural outcomes.
Ventura et al. (2023)	USA	77	19.4 ± 0.9 months	Child satiation and temperament	Children whose mothers use TV /mobile device during mealtimes exhibited stronger early/subtle

					satiation cues and greater temperamental negative affectivity.

Visuo-Ocular Impacts

Seven non-interventional studies reporting on the visuo-ocular impacts of screen time in the first 1001 days met the inclusion criteria, with the majority of evidence arising from the Far East, particularly China (four studies). Refractive error was the key focus of the included studies; three were based on data from the Longhua Child Cohort Study (LCCS; Huang et al., 2020; Huang et al., 2021; Yang et al., 2020), a prospective cohort study of the influence of the family environment on psychobehavioural development of pre-schoolers. Based on data from 26,433 LCCS participants, Yang et al. (2020) reported that screen exposure in early life could be associated with a higher risk of myopia, with the first postnatal year appearing particularly sensitive. A significant association was observed between initial screen exposure that occurred during 0-1 years of age and myopia for pre-schoolers without myopic parents, while for those with myopic parents, the strongest association was found in children with initial exposure in the first postnatal year. Huang et al. (2021) observed that from age 1-3 years, the proportion of children exposed to screens increased, whilst the proportion who went outdoors ≥7 times per week and went outdoors for ≥60 minutes at a time, decreased. Exposure to fixed screens, mobile screens, and limited outdoor activity were associated with preschool myopia. For those with myopic parents, the interactions between outdoor activity and screen use were significant, suggesting that for this group, the impact of early screen use on preschool myopia could be reduced by outdoor activity. Also, from LCCS participants, Huang et al. (2020) reported a higher risk of astigmatism in pre-schoolers exposed to screens during very early life, and the risk increased as duration and years of exposure increased.

In a cross-sectional study of 9,913 children aged 4-6 years in China, 14.4 % had ‘abnormal vision’ in at least one eye, including refractive error, amblyopia or strabismus (Liu et al., 2024). Along with other risk factors including long duration of television watching and close television viewing distance, early exposure to electronic devices (before age 2 years) was associated with a higher risk of abnormal vision. Conversely, amongst a smaller sample of 471 children who were part of the Growing Up in Singapore Towards healthy Outcomes (GUSTO) cohort, more than one third were myopic at age 9 years, with refractive error measured using cycloplegic autorefraction (Wu et al., 2026). Screen time and paper-based reading and writing time were captured at ages 2, 3, 6 and 9 years, with a significant association identified between reading and writing time at ages 6 and 9 years and myopia, but no relationship was observed between screen time at any age and myopia.

Some work published relatively recently has considered the impact of early-life screen time on children born more than 20 years ago (Bro and Ludvigsson 2025; Matsuo and Yorifuji 2021). Notably, screen time from this period would have involved modalities that require less accommodative and vergence effort than modern tablets and

smartphones. Amongst 28, 820 individuals born in 2001 in Japan, when television watching was the main form of play at age 1.5 years, parents were more likely to report concerns about their child's vision (Matsuo and Yorifuji 2021). In 5,200 young adults who had been part of the prospective birth cohort study All Babies in Southeast Sweden (ABIS), 29 % were myopic, with female gender, higher education level and less time outdoors in childhood associated with an increased risk of myopia development; screen time (television and computer games) at age 2 years and older showed no significant association with subsequent myopia (Bro and Ludvigsson, 2025).

Collectively, the available evidence provides inconsistent support for an association between early screen use and subsequent development of refractive error, particularly myopia. Myopia represents a significant public health challenge given the substantial increase in prevalence observed in some regions in recent decades and the risk of associated sight-threatening ocular conditions in later life such as myopic maculopathy (Bullimore and Brennan 2019; Sankaridurg et al., 2021). The condition has a number of non-genetic risk factors, including educational pressure, whilst time outdoors is recognised as protective against myopia development (Morgan et al., 2021). More, rigorous, work is needed to clarify the role of screen time in early life as a risk factor for myopia development, including accurate and direct measures of refractive error, along with more objective and nuanced evaluation of contemporary screen use.

Table 8: Studies identified in the systematic review that included children aged 0-2 and impact on visuo-ocular health

Author (year)	Country	Participants (n)	Age range	Visuo-Ocular Outcome	Findings
Bro and Ludvigsson (2025)	Sweden	5,200	22-24 years but considered screen time at age 2 years and older	Myopia	Female gender, higher education level and less time outdoors in childhood associated with increased risk of myopia development; screen time (television and computer games) at age 2 years and older showed no significant association with subsequent myopia.
Huang et al. (2020)	China	28,029	Mean age 4.6 years but considered screen use from birth	Pre-school astigmatism	A higher risk of astigmatism in pre-schoolers exposed to screens during very early life, and the risk increased as duration and years of exposure increased.
Huang et al. (2021)	China	26,611	Mean age 4.6 years (emmetropes) and 4.7 years (myopes) but considered screen use from age 1 year	Pre-school myopia	Exposure to fixed screens, mobile screens, and limited outdoor activity were associated with preschool myopia. For those with myopic parents, the interactions between outdoor activity and screen use were significant, suggesting that for this group, the

					impact of early screen use on preschool myopia could be reduced by outdoor activity.
Liu et al. (2024)	China	9,913	4-6 years (considered screen exposure before age 2 years)	'Abnormal vision' i.e. reduced unaided vision or significant interocular difference in vision	14.4 % had 'abnormal vision' in at least one eye. Along with other risk factors, early exposure to electronic devices (before age 2 years) was associated with a higher risk of abnormal vision.
Matsuo and Yorifuji (2021)	Japan	28,820	7-12 years but considered television/ video watching from age 1.5 years	Parental concerns regarding reduced visual acuity	When television watching was the main form of play at age 1.5 years, parents were more likely to report concerns about their child's vision.
Wu et al. (2026)	Singapore	471	9 years of age	Myopia at age 9 years	Significant association identified between reading and writing time at ages 6 and 9 years and myopia, but no relationship was observed between screen time at any age and myopia.
Yang et al. (2020)	China	26,433	2-7 years (considered screen use from first year of life)	Pre-school myopia	Screen exposure in early life could be associated with a higher risk of myopia, with the first

					postnatal year appearing particularly sensitive.

Exposure to Radiofrequency Electromagnetic Fields

Radiofrequency electromagnetic fields (RF-EMFs, spanning frequencies from 100 kHz to 300 GHz) have seen expanding technological applications in recent decades. RF-EMFs are now widely used across multiple domains including telecommunications (e.g. mobile phones, radio and television broadcasting), domestic appliances (e.g. Wi-fi, baby monitors), medicine, security and navigation (Johnson et al., 2024). Several studies, largely based in Türkiye, have examined the putative link between prenatal and postnatal exposure to radiofrequency electromagnetic fields and subsequent health impacts.

Bektas et al. (2020) examined the effects of radiofrequency radiation emitted from mobile phones and Wi-Fi exposure on umbilical cord blood and placenta, with samples collected immediately after birth. Compared to those who did not use mobile phones or Wi-Fi during pregnancy, or were exposed to Wi-Fi alone, an increase in oxidative stress parameters 8-hydroxy-20-deoxyguanosine (8-OHdG), malondialdehyde (MDA), protein carbonyl (PCO) and total oxidant status (TOS) in cord blood and placenta was detected in samples from those examined to mobile phones. Tail movement and tail intensity, indicators of DNA damage, were higher in those exposed to mobile phones, with significant differences between the three exposure groups. The findings suggest that mobile phone exposure during pregnancy may cause oxidative stress and DNA damage in cord blood and placenta, and that the effects of mobile phone use and Wi-Fi exposure in combination may have a higher potential for harmful effects.

Regarding foetal growth and mobile phone use during pregnancy, Boileau et al. (2020) examined the impact of electromagnetic waves from pre-natal mobile phone use on the infants of 1,378 mothers in France. Infants whose mothers had used mobile phones for ≥30 minutes/ day were more likely to have an AUDIPOG score ≤10th centile, indicating foetal growth restriction, although no clinically relevant association between mobile phone time and birthweight or head circumference was observed. Amongst 1,495 pregnant mothers, Büyükeren and Yaman (2024) found a higher rate of delivering a small for gestational age (SGA) foetus in those who had used phones with higher specific absorption rate (SAR) values, representing the rate of electromagnetic energy absorbed by body tissues. A cut-off SAR value of 1.23 W/kg for giving birth to an SGA baby was identified through ROC curve analysis with 69.3% sensitivity and 73.0% specificity. No relationship was found between duration of phone use during pregnancy and SGA birth rate, although daily use times were generally long, with a median of 190 minutes for both the SGA and non-SGA groups.

Exposure to RF-EMFs in the prenatal or postnatal period has been associated with sleep disturbances in children aged from 1 month (Çöl et al., 2021). Through a survey-based study of 400 children in Türkiye, Çöl et al. (2021) observed that sleep problems including night waking, waking up crying, bedtime resistance and difficulty falling asleep were

more common in children whose mothers had lived near a base station during pregnancy, and in children whose mothers had used electronic devices during pregancy, sleep disorders were more common and sleep duration was shorter. Presence of electronic media devices in children's night-time sleeping environments was also associated with an increased frequency of sleep problems.

A putative link between congenital anomalies of the kidney and urinary tract (CAKUT) and maternal mobile-phone related EMF exposure was explored (Çeleğen et al., 2024). The aetiology of CAKUT is multifactorial, with several associations found, including: excess weight gain during pregnancy related to an increased risk of CAKUT whilst folic acid use before pregnancy was protective for CAKUT. The mobile phone call time of mothers of the CAKUT group was significantly longer than controls.

Overall, current evidence on prenatal and early-life RF-EMF exposure and health outcomes remains limited, with some studies suggesting potential biological and developmental effects but no clear causal relationships. Further, well-designed, prospective studies with accurate exposure assessment would be needed to clarify these associations and establish potential mechanisms.

Table 9: Studies included in the systematic review that looked at electromagnetic frequency/radiation

Author (year)	Country	Participants (n)	Age range/ group	Outcome	Findings
Bektas et al. (2020)	Türkiye	149	Pregnant women aged 18-40 years	Oxidative stress and DNA damage in umbilical cord blood and placenta	Mobile phone exposure during pregnancy may cause oxidative stress and DNA damage in cord blood and placenta, and that the effects of mobile phone use and Wi-Fi exposure in combination may have a higher potential for harmful effects.
Boileau et al. (2020)	France	1,378	Neonates	Foetal growth	Infants whose mothers had used mobile phones for ≥30 minutes/ day during pregnancy were more likely to have an AUDIPOG score ≤10th centile, indicating foetal growth restriction.
Büyükeren and Yaman (2024)	Türkiye	1,495	Pregnant women	Neonatal outcomes	A higher rate of delivering a small for gestational age (SGA) foetus was observed in those who had used phones with higher specific absorption rate (SAR) values.
Çeleğen et al. 2024)	Türkiye	57 cases and 57 healthy controls	<2 years	Congenital anomalies of the kidney and urinary tract (CAKUT)	The mobile phone call time of mothers of the CAKUT group was significantly longer than controls. The aetiology of CAKUT is multifactorial, with several associations found.
Çöl et al. 2021	Türkiye	400	1 month- 5 years (2.14±1.58	Children's sleep patterns	Sleep problems were more common in children whose mothers had lived near a base station during pregnancy. In children whose

			years). Considered mother's exposure to EMFs during pregnancy		mothers had used electronic devices during pregnancy, sleep disorders were more common, and sleep duration was shorter. Presence of electronic media devices in children's night-time sleeping environments was also associated with an increased frequency of sleep problems.

Psychological Impacts

Screen time was a risk factor for worse mental health in children with neuro psychiatric disorders during COVID (Olivia et al., 2021). Not using screens was a protective factor against lower neuro-psychomotor development (Mélo et al., 2025).

Problematic Use of Technology

One of the most frequently voiced concerns about new technologies is the worry that usage in excessive amounts, or specific patterns of maladaptive use, might give rise to problematic or addictive tendencies. For this section, 'problematic use' is used over 'addiction' because there is pervasive disagreement about the nature of problematic technology use, the criteria used to define it, the risk of stigmatisation, and the applicability of them to young children, where technology use is often mediated by parents and caregivers (Domoff et al., 2020). Adopting 'problematic use' is also consistent with the theoretical and empirical research literature on the topic (Domoff et al., 2020; 2024).

A total of 38 studies were found that touched on problematic or addictive technology use. Of these, 16 focused on pregnant women, 14 on parents, and 12 on children. All the studies on infants were conducted in the United States. The studies on pregnant women were most frequently carried out in China (5), followed by Türkiye (4) and the Netherlands (2). The studies focusing on parental PMU (problematic media use) were most frequently conducted in the United States (6).

Infants During 1001 Critical Days

The systematic review identified a total of 12 studies that measured problematic media use between the ages of zero and two. However, these studies were sourced from just two datasets. The primary dataset used here, Project M.E.D.I.A., assessed problematic use at approximately age 2.5 and was used in 11 studies on problematic use in infants, two studies on problematic use in parents, and several more on non-problematic use. The second dataset, reported by Thompson et al. (2025a) assessed infants at 15-26 months, validated a novel measure of screen affinity (TV and mobile/tablet specifically). This data has also been used in several other studies published since the searches were undertaken (Thompson et al., 2025b; 2026a; 2026b).

This has identified several protective factors against potential PMU at age 2.5, including children being exposed to greater amounts of educational content earlier on (Coyne et al., 2022), parental self-efficacy (in general and in specific relation to media) (Coyne et al., 2023), media monitoring (Coyne et al., 2023), and greater attachment security (Shawcroft et al., 2024). There was limited evidence that specific types of rules were effective in limiting PMU. Shawcroft et al. (2023) found that while most parents had

rules in place for TV and/or tablet use, only parental rules that completely restricted tablet use (adopted by around 10% of parents) were associated with lower PMU, and this effect was not consistent; these rules did not have a significant effect when followed up 12 months later, but a difference was observed at 24 months.

In contrast, several behaviours appear to confer a greater risk of infant PMU. This includes the use of media as a coping mechanism (Coyne et al., 2020), watching of aggressive media content (Holmgren et al., 2023), and profiles characterised by moderate to heavy social media and gaming (Holmgren et al., 2024). Use of media to regulate children's emotions was also found to be linked with greater PMU and emotional reactivity (Coyne et al., 2021). There was mixed evidence, depending on whether the study focused on shorter (Holmgren et al., 2022) or longer (Shawcross et al., 2025) periods, and whether postpartum depression was associated with child PMU. Media use was also associated with differences in RSA (Respiratory Sinus Arrhythmia) that appear to support the idea that media use displaces other activities (i.e., play, exercise) (Porter et al., 2026).

There are some considerations that it is important to keep in mind when appraising the strength of the evidence base on problematic technology use in infants. Both data sources discussed here have important strengths. Project MEDIA is an ongoing prospective study of parent and child media behaviours that was initiated in 2017 and is set to continue for another 15+ years. It currently has five waves of data collected, with a sixth planned for this year (2026) and collects detailed information about a wide range of interactions that both children and parents have with media. The study conducted by Thompson and colleagues (2025) has the advantage of using a mixed methods approach, whereas the other scale was designed from criteria use to assess internet gaming disorder in adulthood. Thompson et al. created a culturally and contextually relevant measure of affinity towards TV and mobile phones that is specifically designed for children during the 1001 critical days period.

At the same time, it has some limitations that are important to discuss. The data from this study is on the boundary of relevance to the systematic review. The first measure of problematic media use is taken at age 2.5. The assessment scale, which is completed by parents, has not been tested for validity in younger children. Several papers noted that the study samples from a relatively homogenous subset of the population in the area (Denver) the study takes place. In particular, the sample skews towards white, educated, high income families within this area. The point on ethnicity is especially notable as the other study into problematic use in infants (Thompson et al., 2025) also sampled from the Denver area, but focused on Hispanic parents, who comprise around a third of the population. With Project M.E.D.I.A., it is also challenging to draw firm conclusions about the impacts of PMU after 2.5, because of the effects of the pandemic. The data collection at 2.5, which first measured PMU, occurred in 2019. In

subsequent years, changes in overall media use and the impact of PMU on future behaviour are confounded by the possibility that these could be explained by developmental effects, or sudden shifts due to the pandemic.

Second, there are caveats with the assessment of PMU used. The Project M.E.D.I.A study uses a scale called the Problematic Media Use Measure – Short Form (PMUM-SF) to measure problematic media use (Domoff et al., 2019). This is designed to be filled out by parents about their child's screen media behaviours. It was developed from a larger sixty-item measure, that was developed around the proposed criteria for Internet Gaming Disorder in the DSM-5 (APA, 2013). However, the PMUM-SF has not been formally validated for use in toddlers. Although designed with children under 12 in mind, the scale was developed and validated on children aged 4-11 (Domoff et al., 2019). While the scale was designed to be appropriate for younger children, without validation it is not possible to know whether it misses problematic behaviours that are systematically different between infants and older children. Additionally, some of the items may be less relevant for infants or might be more likely to be misinterpreted when applied to younger children. Finally, it is not clear that these criteria translate to timescales relevant to the 1001 critical days; the DSM criteria are typically assessed over a one-year period. Domoff and colleagues (2019; 2020) use a shorter timeframe of one month, but the rationale and justification for this have not been explained. Measures of PMU, although flexible, do not on their own give insight into which types or patterns of technology use are problematic. Conversely, the measure developed by Thompson et al. (2025a) only covers two forms of media, and because they are designed to be culturally relevant for Mexican American families, will require validation or revision when used in other populations.

However, there are reasons to suggest that this measure has promising properties that emphasise the need for psychometric validation. For example, studies using the Project M.E.D.I.A. dataset have indicated that problematic media use is generally stable over time (Coyne et al., 2022). When the sample was tested on PMU measures 1-2 years later, their overall scores were similar to age 2. Depending on how the different items vary, this may indicate that these indicators are consistently measuring behaviours that may give rise to problematic behaviours.

Table 10: Studies included in the systematic review that looked at problematic use of media

Author (Year)	Country	Participants (N)	Age	Outcomes	Findings
Child					
Coyne et al. (2020)	USA	170 expectant and then postpartum mothers	20 – 40 weeks pregnant (W1), ~ 1.5 years	Problematic use, attitudes, parental use	Using media to cope by mothers associated with higher infant media use and technoference. Prenatal and infant media use are correlated. Higher prenatal media use and lower depression linked with lower technoference.
Coyne et al. 2021	USA	269 toddlers and parents	~ 2.5 years	Problematic use, temperament, emotional reactivity	Temperament subdomains associated parental use of media to regulate emotions, which was associated with PMU and high emotional reactivity.
Coyne et al. (2022)	USA	443 infants, parents	~ 2.5 years	Problematic use	PMU was stable 1 year later and didn't predict future TV content choices. Early educational TV viewing protected against PMU.
Coyne et al. (2023)	USA	432	~ 2.5 years	Problematic use	Parental media and general self-efficacy protected against PMU, as did use of restrictive forms of parental media monitoring.
Holmgren et al. 2022	USA	491 mothers and children	~ 6 months, 1.5 years, 2.5 years	Problematic use, parent-child interactions, depression	PPD associated with parent and child PMU, as is frequency of dysfunctional interactions.
Holmgren et al. (2023)	USA	446 caregivers	~ 2.5 years	Problematic use, aggression, prosocial	Identified latent classes of low TV, child centric TV viewing, and high aggression content. High aggression linked with greater physical and relational aggression, and higher PMU

Holmgren et al. (2024)	USA	268 mothers	~ 6 months (W1), ~ 2.5 years (W2)	Problematic use	Latent profiles associated with higher gaming and social use linked with greater technoference, parent and child PMU.
Porter et al., (2026)	USA	269 children and parents	~ 2.5 years, 3.5 years, 4.5 years	Problematic use, development	Media use increased during pandemic. Pre-COVID media use associated with subsequent resting state arrythmia activity.
Shawcroft et al. (2023)	USA	435 children and parents	~ 2.5, 3.5, 4.5 years	Problematic use	43% of parents had rules about tablet use, and 64% for TV. No associations between TV rules and PMU. Rules banning tablets had no impact on PSU at T2 but were associated with lower PMU severity at T3.
Shawcroft et al. (2024)	USA	224 parent-caregiver dyads	~ 1.5 years	Problematic use, attachment	Infant attachment security protective against PMU. Not mediated by parent-child interactions, although these are linked with lower PMU.
Shawcroft et al. 2025	USA	501 mothers and children	~ 6 months, 1.5 years, 2.5 years, 3.5 years, 4.5 years	Problematic use, technoference, depression	Relatively few links between trajectories of maternal depression and media use – trajectories characterised by decreasing depression associated with lower PMU.
Thompson et al. (2025)	USA	32 parents (Study 1), 384 mothers (Study 2)	15 – 26 months	Problematic use	Developed age and culturally appropriate measure of 'affinity' to screen use as a precursor to problematic use. Median TV use amongst children was 92 mins, and 21 mins on phones. TV and mobile scales were associated with respective media use and poor social-emotional competencies. The mobile scale also correlated with behavioural problems.
Pregnant					
Bingol et al. (2024)	Türkiye	3870 pregnant women	Prenatal	Problematic use, anxiety	PSU (NMP) was correlated with childbirth related fears.

Bozan et al. (2023)	Türkiye	500 pregnant women	Prenatal	Problematic use	Both social media use and PSMU are prevalent in pregnant women.
Constantino et al. (2023)	Italy	237 pregnant women	Prenatal	Problematic use, RF exposure	Concerns about phone use were low and had not changed during pregnancy.
Kiyak et al. (2024)	Türkiye	257 pregnant women	Prenatal	Problematic use, sleep, depression	Association between PSU and sleep disturbances mediated by depression.
Ma et al. (2024)	China	342 pregnant women	Prenatal	Problematic use, stress, self-efficacy	PSU increase during pregnancy and was correlated with pregnancy stress and low self-efficacy.
Muskens et al. (2023)	Netherlands	697 pregnant women	Prenatal	Problematic use, depression	Trajectories of more severe depression associated with greater PSMU.
Muskens et al. (2024)	Netherlands	1135 pregnant women	Prenatal	Problematic use	Volume, frequency and problematic social media use increased during pregnancy.
Samra et al. (2024)	Australia	225 pregnant women	Prenatal	Problematic use, depression, anxiety, body image, social comparison, eating disorder	PSMU associated depression, anxiety and disorder eating in pregnant women. Associations are mediated by poor body image and negative social comparisons.
Sanli et al. (2025)	Türkiye	277 pregnant women	Prenatal	Problematic use, stress, attachment	Social media usage prevalent, PSMU moderate. PSMU and pregnancy stress correlated.
Sato et al. (2023)	Japan	238 pregnant women	Prenatal	Problematic use	Half of women gamed during pregnancy, IGD scores very low. Women who gamed increased gaming during pregnancy.

Sobol et al. (2025)	Poland	30 pregnant women and partners	Prenatal	Problematic use, depression	Partner's PSMU associated with pregnant women's depression and fatalism.
Wade-Bohleber et al. (2024)	Switzerland	94 mother-father-child triads	Prenatal	Problematic use, technoference	Little change from perinatal to postnatal period. Mothers rated partners as experiencing more technoference.
Yang et al. (2022)	China	1060 pregnant women	Prenatal	Problematic use, quality of life	Prevalence of IA in pregnant women was 30.19%, and items about requesting time to spend longer online a bridging node between IA and QoL.
Yang et al. (2024)	China	665 pregnant women	Prenatal	Problematic use, depression	SA, phone use, TV use, and phone use before bed associated with depression.
Parent					
Apostolopoulos et al. (2021)	Australia	20 post-partum mothers	12-36 weeks	Physical activity and screen time	Mixture of individual, social and environmental influences impacted PA, but only individual and social for screen time. Common sets of strategies to intervene on both (in-person social activities, tracking apps, awareness raising).
Arumugam et al. (2025)	Malaysia	100 parents	Children aged 15-21 and 33-42 months	Problematic use	Successfully developed a parental measure of media addiction.
Inoue et al. (2021)	Japan	195 post-partum mothers	~ 1-3m (W1), 6-10m (W2)	Attachment, technoference	Smartphone use during breastfeeding is habitual and prevalent but does not affect parent-child bonding.
Koire et al. (2024)	USA	383 postpartum mothers	0-6 months	Coping, depression, anxiety	Majority of women in sample used some form of virtual support group. Women using these groups tended to use social media to alleviate loneliness, but limited evidence of efficacy.
Konrad et al. (2021)	Germany	54 mother-infant dyads	20-22 months	Technoference, attachment	Interruptions led to decrease in maternal responsiveness and pedagogical behaviour, and increases in positive and negative bids for attention, negative affect (albeit from low

					base) and toy engagement. Prohibited behaviours increased through task.
Linder et al. (2021)	USA	248 parents	11 – 26 months	Attachment, problematic use	Parental absorption in media predicted attachment insecurity.
McDaniel et al. (2023)	USA	268 parents of infants	~ 6 months	Problematic use, behaviour change	Fairly low levels of behaviour change endorsed – contemplators reported higher bedtime media, social media use, and perceived PSU.
McDaniel et al. (2025)	USA	183 mother-father dyads	0-5 years (mean = 2 years)	Technoference, stress	Parents spend more time texting than on social media, than on gaming. Mothers tended to use social media more, fathers gamed more. Parenting stress was correlated with gaming and social media based technoference.
Nomkin et al. (2021)	Israel	20 mothers and babies	~ 3-6 months	Problematic use	Mothers looked at their child less during the breastfeeding than the face-to-face phase. Electrodermal activity correlated with phone use during breastfeeding, and smartphone addiction.
Sabha et al. (2022)	Saudi Arabia	284 parents	Children 0-4 years, median < 2 years	Problematic use, attachment	Parental IA associated with perceived insecure attachment.
Schneebeli et al. (2025)	Switzerland	261 parents of 142 children	~ 1.25 years	Problematic use, temperament, stress	There was a mediating relationship between difficult child temperament, stress, and parental PSU.
Williams et al. (2025)	USA	252 mothers	~ 1 year	Coping, depression, anxiety	Technology use was one of multiple ways in which women coped with stress. Did not formally evaluate different types, but coping overall effective.
Wolfers et al. (2023a)	Germany	218 mothers	Youngest child aged 18 months	Problematic use, stress, coping	Phone use in stressful situations common. Using phones for coping was linked with cognitive salience of the phone and

					the relevance to the stressor. Limited effectiveness as a coping strategy.
Zhang et al. (2020)	China	419 mothers	0-6 weeks	Depression, anxiety, sleep quality	Engagement with social media (WeChat) was high (average 0.9 posts per day). Data scraped from social media accounts identified most photos posted of people (especially their child) and objects. Selfie posting associated with depression.
Zurcher et al. (2020)	USA	341 mother-father dyads	0-1 years	Problematic use, technoference, executive function	Difficulties with EF linked with media use in mothers and fathers, which in turn associated with technoference.

Pregnant Women

Fifteen studies that focused on addiction or problematic use investigated women during pregnancy. The literature focused on social media use, smartphone use, internet use, and gaming, in order of frequency. Multiple studies using stronger methodologies, specifically incorporating longitudinal designs to investigate changes in technology use (Ma et al., 2024; Muskens et al., 2023; 2024; Sato et al., 2023; Wade-Bohleber et al., 2024), were found in this cluster. These studies identified increases in technology (i.e., smartphone, social media, gaming) use as pregnancy progressed, and associations between problematic technology use and poor mental health (especially depression and anxiety). One study longitudinally tracked parents and their technology use from pregnancy into infancy (Wade-Bohleber et al., 2024). This study found that although phone use and problematic use (which was quite low) did not fall post-pregnancy, feelings of immersion in phone use did once the child was born.

Use of technology was ubiquitous in most samples included in the review. Overall levels of addiction, predominantly to social media, were comparatively moderate in prevalence and intensity (Bozan et al., 2023). None of the studies reported primary data comparing prevalence rates to similar or matched controls. Based on existing systematic reviews and meta-analysis, it appears unlikely that the degree of severity and prevalence of problematic or addictive technology use is substantially higher during pregnancy. That is, although women report increasing levels of problematic use, the overall amount of problematic use experienced does not appear elevated compared to the general population at large. There is probably enough literature on this to feasibly conduct a separate systematic review and meta-analysis.

Multiple cross-sectional (Bingol et al., 2024; Kiyak et al., 2024; Sanli et al., 2025; Sobol et al., 2025; Yang et al., 2022; Yang et al., 2024) and longitudinal (Ma et al., 2024; Muskens et al., 2023) have identified correlations between problematic technology use and low mood (i.e., severity of depression and anxiety). As with overall prevalence and severity of problematic use, it is not known whether these associations are qualitatively different in pregnancy.

Parents

One study reported the development of media use and addiction scales that were adapted from the Media and Technology Usage and Attitudes Scale (MTUAS) (Rosen et al., 2013) and the technoference literature (Arumgam et al., 2025).

Three studies looked at attachment (one prenatal, two postnatal) (Linder et al., 2021; Sabha et al., 2022; Sanli et al., 2025). One study found no association between social media addiction and prenatal attachment. Two studies found problematic use (internet addiction, media absorption) were associated with lower attachment security among parents (Linder et al., 2021; Sabha et al., 2022). There are several possible explanations for why this might occur. Linder et al. (2021) interpret the findings predominantly in terms of the impact of specific types of media engagement, and their impact on the child. However, it is also possible that perceptions of attachment and worries about technology use are influenced by a common factor (i.e., stress, depression, anxiety). At the same time, it is known that parents tend to report greater positivity when evaluating their attachment to their child.

One study (McDaniel et al., 2023) looked at attitudes towards behaviour change in parents of infants, using a scale derived from the Health Beliefs Model to derive latent classes of types of behaviour change. They found that 15% of their sample were 'pre-contemplators', i.e., were actively disinterested in changing their phone use behaviours. The remaining 85% were classified as 'contemplators' in that they were either concerned about their phone use, or saw the benefits of doing so, but had not taken any actions to do so. These appeared to reflect differences in technology use – contemplators reported more phone use around bedtime, and greater perceived problematic use and technoference.

Qualitative research by Apostolopoulos and colleagues (2021) interviewed 20 recently post-partum mothers to explore the role of individual, social, and environmental factors in motivating/preventing physical activity and general screen time. For screen time, no environmental factors emerged, but Apostolopoulos et al. found that screen time was individually motivated by two themes. The first, which they referred to as 'habit/addiction', which was prevalent throughout the interviews, particularly characterised by 'switching off', mindless, and driven by a need to reduce boredom. The second theme focused on mothers actively enjoying and looking forward to technology use. Socially, technology use was affected by feelings of needing to portray a positive role model to their newborn, technology being a lifeline against social isolation (and being reduced when face to face interaction presents itself), and an expectation to socially connect via technology. The interviews also discussed perceptions of possible strategies to intervene on screen time, with participants more disposed towards approaches that create opportunities for in-person interaction, screen time tracking, and general awareness raising.

Three studies looked at the role of intrusive and problematic technology (specifically smartphone) use during specific types of interaction, particularly breastfeeding (Inoue et al., 2021; Nomkin et al., 2021) and play (Cosottile, 2022; Konrad et al., 2021). One study (Inoue et al., 2021) used a longitudinal survey design, and three studies adopted experimental designs in which mothers were asked to breastfeed or play with their infant, and the study authors created distractions by contacting their phone (Cosottile, 2022; Konrad et al., 2021; Nomkin et al., 2021). Overall, these studies found limited evidence of harms. The research on breastfeeding found limited evidence of harm in general. The study on play demonstrated that distractions were associated with behavioural responses in children, but this was common across digital and non-digital distraction. The distraction was problematic, not whether it was driven by digital media.

Neurodevelopmental Disorders (ASD/ADHD)

Many studies have looked at the relationship between technology use and developmental outcomes, particularly in attention and social interaction. Looking at children more broadly, there have been four systematic reviews looking at the relationship between screen use and ASD (or ASD-like symptoms). Two of these have been framed around the effects of technology use on ASD (Ophir et al., 2023; Yuan et al., 2024), and two around increased preferences for technology use (i.e., as a coping mechanism) in people with ASD (Slobodin et al., 2019; Stiller and Mossle, 2018). These have generally identified an association between greater volumes and intensity of technology use, and ASD prevalence and traits, with several large caveats attached. Observed effects are highly heterogeneous; the least consistent, yet strongest associations have been found in studies measuring general screen time (Ophir et al., 2023; Yuan et al., 2024). Some activities, such as watching movies/DVDs may not show similar susceptibilities (Yuan et al., 2024), or in the case of social media, may be less common in children with ASD (Ophir et al., 2023). Multiple reviews have also commented on the methodological quality of this literature, a high risk of bias, and the absence of causally conclusive evidence.

Research exploring the relationship between early screen exposure and neurodevelopmental outcomes suggests a complex and still-uncertain pattern, but several studies point toward a potential increase in ASD-like symptoms among children with high levels of early screen use (Dikkala et al., 2022; Heffler et al., 2020; Sugiyama et al., 2023). Passive screen experiences, in particular, may elevate this risk, possibly because they reduce opportunities for interaction with caregivers and peer-experiences that are crucial for social, communicative, and imaginative development (Heffler et al., 2020; Melchior et al., 2022). Evidence indicates that children exposed to screens before six months of age are nearly three times more likely to fall into a high-risk category for ASD compared with those first exposed later or not at all (Chakhunashvili and Chakhunashvili, 2025). Similarly, children who engage in three to four hours of daily screen time show more autism-like behaviours, a pattern thought to stem from reduced social engagement and diminished imaginative play (Dikkala et al., 2022; Heffler et al., 2020). Among children diagnosed with ASD, greater overall screen time, and less communication time, were associated with higher severity of ASD symptomology (Sadeghi et al., 2023). It is important to note these could reflect differences in verbal capacity that can vary considerable across the spectrum of ASD.

Longitudinal cohort studies further reinforce this association, showing that greater screen exposure combined with lower levels of caregiver–child play in early life predicts higher levels of ASD-like symptoms later in childhood (Heffler et al., 2020; Melchior et al., 2022). Data from cohort studies have found that higher levels of screen time earlier on in childhood are prospectively associated with subsequent ASD diagnosis (Hill et al.,

2024; Kushima et al., 2022; Sugiyama et al., 2023). While these findings do not establish causation, they highlight the importance of early experiential factors such as interaction, play, and shared attention as potential protective influences (Heffler et al., 2020). Further research is needed to clarify whether screen use itself contributes to ASD-related behaviours or whether increased screen exposure reflects underlying developmental differences that emerge early in life (Chakhunashvili and Chakhunashvili, 2025; Dikkala et al., 2022).

There was mixed evidence of associations between technology use, attention processes, and potential markers of ADHD. Hill et al. (2024) found that children flagged as being flagged for potential concerns around ADHD symptoms reported greater screen time than controls, similar to ASD. Several studies have looked at the relationship between technology use and attentional processing. Two used behavioural tasks in the laboratory (Lui et al., 2021; Portugal et al., 2021) and one measured trait focused attention using a psychometric assessment (Gueron-Sela et al., 2021). The two behavioural tasks showed limited evidence of deficits, finding that children who frequently used tablets had better exogenous but worse endogenous attentional control (Portugal et al., 2021) and that volume of touchscreen use was not associated with inhibition (Lui et al., 2021). One study (Gueron-Sela et al., 2021) found that a composite screen time measure derived from maternal, child, background and coping-oriented use was associated with lower effortful control.

Table 11: Studies included in the systematic review focusing on neurodevelopmental disorders (ASD and ADHD)

Author (year)	**Country**	**Participants (n)**	**Age range/ group**	**Outcome**	**Findings**
Chakhunashvili and Chakhunashvili (2025)	Georgia	646	16–30 months (mean age not reported)	Risk of autism spectrum disorder (M-CHAT-R scores)	Earlier onset of screen exposure was associated with higher autism risk scores and appeared more influential than duration alone.
Dikkala et al. (2022)	India	80	9–36 months (majority 12–24 months)	Occurrence of autism spectrum disorder (ASD) / autistic traits	Autistic-like symptoms were more prominent in toddlers with higher screen exposure, particularly those viewing screens for more than 3–4 hours per day.
Gueron-Sela et al. (2020)	Israel	199 mothers	~ 18m, 22m, 26m	Focused attention assessed using ECBQ-SF	Cumulative risk (child screen time, maternal screen time, background TV, use of media to regulate child distress) associated bivariate and in one ARCL path to poor focused attention. Correlations bit stronger for using media to regulate child distress than other domains.
Heffler et al. (2020)	USA	2152	12 months and 18 months (children assessed at both ages)	ASD risk (M-CHAT / M-CHAT-R) and ASD-like symptoms	Greater television or video exposure and reduced caregiver–child interactive play at 12 months were associated with increased ASD-like symptoms, as measured by M-CHAT-R scores, although no association was found with formal ASD diagnosis risk. In contrast, lower

					screen exposure combined with greater parent–child interaction at 12 months was linked to fewer ASD-like symptoms at 2 years.
Hill et al. (2024)	USA	82 children	~12m, 18m, 24m, 36-64m	ASD and potential ADHD (diagnosis, external rater), severity of ASD/ADHD traits	Children with ASD (1.47h) and suspected ADHD (1.27h) engaged in more screen time than controls (0.72h). Screen time was also associated with greater symptom severity and weaker developmental outcomes, especially in language domains.
Kushima et al. (2022)	Japan	84030 mother-child dyads	1 year	ASD was based on parental report of a clinical diagnosis	Higher screen time at age 1 was associated with odds of ASD at 3 (OR = 2.16 at 1-2h, OR = 3.48 at 2-4h, and 3.02 at 4h+), in boys, but not in girls.
Lui et al. (2021)	UK	156 infants	10 months	Inhibition assessed using performance in behavioural task, executive function via EEFQ	No association between touchscreen use and inhibition. Overall correlation between touchscreen use and higher executive function.
Melchior et al. (2022)	France	12,950	Children aged 2 years	Risk of autism spectrum disorder (ASD) / neurodevelopmental outcomes	Early screen media use was associated with differences in ASD risk, but the relationship was complex and not purely linear, suggesting multiple influencing factors.
Portugal et al. (2021)	UK	56 infants	~1y, 1.5y, 3.5y	Attention performance in two behavioural tasks	Long term tablet users demonstrated better exogenous attentional control, and worse

					endogenous attentional control compared to low table usage.
Sadeghi et al. (2023)	Iran	68 infants	16-36m (M = 27m)	Risk of autism spectrum disorder (M-CHAT-R scores)	Screen time was associated with greater ASD symptoms within a clinically diagnosed sample. Longer communication time was associated with lower symptoms. The design precludes causal conclusions.
Sugiyama et al. (2023)	Japan	1258 children	~24m, 32m, 48m	ASD status defined by cutoffs on Modified Checklist for Autism in Toddlers. Adaptive functioning assessed using VABS-II	Average screen time 2.6 hours per day. Screen time was associated with poorer communication and daily living skills. The latter was mediated by outdoor play.

Relationship and Developmental Impacts

Dyad/Triad

Parental and caregiver screen habits play a significant role in shaping young children's media use, particularly in the first two years of life. When parents-especially mothers-use screens frequently, their infants tend to do the same (Chamam et al., 2024; Lin et al., 2020; Schwarz et al., 2025; Webb et al., 2024). This pattern reflects not only modelling behaviour but also the way parental media use can interfere with everyday interactions, a phenomenon often described as technoference (Hanson et al., 2021; Zurcher et al., 2020). Parents who report higher personal media use are also more accepting of using screens while with their child, highlighting the need for parental education that begins with reflection on one's own media habits (Schwarz et al., 2025; Wan et al., 2021).

Excessive parental screen use can disrupt the foundations of early development. Increased infant screen exposure, particularly when combined with high maternal touchscreen use, correlates with weaker early developmental scores, suggesting that frequent engagement with mobile technology may displace richer forms of caregiver interaction and exploration that support early cognitive, motor, language, and social development (Chamam et al., 2024; Melchior et al., 2022; Paulus et al., 2024).

Infants who experience reduced parent–child interaction due to screen exposure may struggle with self-regulation, as they miss out on the verbal, emotional, and physical exchanges that support its development (Krapf-Bar et al., 2022; Lin et al., 2020). Technoference occurs frequently- on average five to six times per day - and even brief interruptions can affect the establishment of joint attention, a core building block of communication and social understanding (Ferjan Ramírez et al., 2021; Zurcher et al., 2020).

Maternal mobile phone use during face-to-face interactions has been shown to reduce both adult and infant vocal activity, weaken parent–infant turn-taking, and dampen infants' emotional responsiveness (Golds et al., 2024; 2025). These disruptions have measurable consequences: toddlers exposed to higher levels of technoference respond less often to joint-attention prompts, and the quality of language input declines when screens are present (Fergan Ramírez et al., 2022; Hanson et al., 2021). Parent language is richer, more complex, and more frequent during shared book reading than during co-viewing television, underscoring how screen mediated interactions can displace more developmentally supportive activities (Webb et al., 2024; Zurcher et al., 2020).

Overall, early parental screen use not only increases children's own screen time but also reduces the quality of interaction that underpins linguistic, socio-emotional, and cognitive development (Chamam et al., 2024; Krapf-Bar et al., 2022; Wan et al., 2021).

Table 12: Studies included in the systematic review looking at parent-child effects

Author (year)	**Country**	**Participants (n)**	**Age range/ group**	**Outcome**	**Findings**
Chamam et al. (2024)	Switzerland	52	12-36 months (M=22 months)	Interactive quality and communication	Parental distraction negatively affects the quality of parent–child interaction and the frequency of communicative bids, regardless of whether the distraction is digital or non-digital.
Ferjan Ramírez et al. (2021)	USA	24	6, 10, 14, 18, and 24 months old (data collected)	Electronic media exposure, age, and socioeconomic status (SES)	On average, the children in the sample were exposed to 58 min of electronic media daily. Electronic media exposure was negatively associated with SES and decreased with child age, but only amongst high-SES families. Lastly, electronic media exposure negatively impacted concurrent adult and child vocal activity, irrespective of SES and infant age.
Ferjan Ramírez et al. (2022)	USA	37	0-2 years (M=13.3)	Parentese, turn-taking, and infant language output	Findings suggest that exposure to electronic media negatively impacts infant vocal activity by reducing parental parentese and parent-infant turn-taking, which are known to positively impact infants' linguistic, socioemotional, and cognitive development.
Golds et al. (2024)	UK	450	3–9 months	Infant development & mother–infant responsiveness	High maternal smartphone use was associated with lower responsiveness and increased developmental concerns.

Golds et al. (2025)	UK	450	3–9 months	Mother-infant responsiveness; infant social-emotional development, birth parity, perceived social support (appraisal), and likelihood of maternal smartphone use when the infant may be perceived as passive	Suboptimal infant social-emotional development, additional children in the family, lack of appraisal support for mothers, as well as maternal smartphone use during critical periods of parenting all demonstrate a negative association with mother-infant responsiveness.
Hanson et al. (2021)	USA	105	15 months (M= 14.73 months) or 30 months old (M= 29.81 months)	Parent language and shared book reading	Shared book reading produces more and richer verbal interactions with toddlers than co-viewing television and is thus more likely to positively influence early language development.
Krapf-Bar et al. (2022)	Israel	114	0-2 (M= 11.35 months)	Parental mobile device use	Maternal mobile phone use during face-to-face interactions with the infant can disrupt the process of establishing joint attention in ongoing mother-child interactions.
Lin et al. (2020)	Taiwan	161	18-36 months (M = 25.63, SD = 5.35)	Behaviour; communication and language	Young children who spent more time on touch screen devices were more likely to have emotional problems, anxious/depressive symptoms, somatic complaints, social withdrawal symptoms, attention problems, and aggressive behaviors, but not language delay.

Melchior et al. (2022)	France	12,950	Children aged 2 years	Risk of autism spectrum disorder (ASD) / neurodevelopmental outcomes	Early screen media use was associated with differences in ASD risk, but the relationship was complex and not purely linear, suggesting multiple influencing factors.
Paulus et al. (2024)	Germany	3035	0-3 years (M = 17.37 months, SD = 13.68)	Socio-demographics, on child media use, and on parental media use	Family factors such as maternal media use time, Problematic Internet Use (PIU) and lower school graduation are significantly associated with young children's digital media use. Parents should be aware of their personal influence on their children's media use which might be due their role in terms of model learning.
Schwarz et al. (2025)	Germany	1295	6-36 months (children assessed across age range)	Parents' internet use (CIUS test), parental screen time in the presence of children, time of screen media in the background, and children's development	High screen media use by parents is linked to higher screen media use by children and has a negative impact on child development.
Wan et al. (2021)	UK	327	6-24 months	Social-emotional functioning- SE competence; SE problems; risk of SE delay	Screen time predicted both SE competence and SE problems, reduced parent-infant play partially mediated the effect on SE competence.
Webb et al. (2024)	USA	63	18-32 months (M=26.1,	Child response to joint attention (number of prompts with joint	Tablet commercial games may be detrimental to early social-communicative interactions, particularly if they

			SD=3.4 months; median [IQR] age, 25 months)	attention response per number of prompts delivered) and child response to behavioural request (i.e., the prompt on which the child responded to the behavioural request)	are reducing or replacing real toy play, parent-child dyadic activities, or peer play.
Zurcher et al. (2020)	USA	505	Caregivers with children under the age of 2	New parents' media usage and technoference beliefs as they relate to executive function, or ones' ability to engage in higher cognitive processes such as attention, impulse control, and task coordination	Increased parental media use was associated with greater acceptance of technoference beliefs. Additionally, higher levels of executive functioning in both mothers and fathers were linked to increased digital media use.

Impacts on Child Development

Negative associations between screen use and developmental outcomes for babies are consistently reported in academic literature. A growing body of evidence shows consistent dose–response relationships and associations between early screen exposure and later developmental difficulties (Brushe et al., 2023; Putnick et al., 2023; Takahashi et al., 2023; Yamamoto et al., 2023; Zhao et al., 2022). Higher screen time at just one year of age is associated with measurable delays in communication and problem solving by ages two and four (Putnick et al., 2023; Takahashi et al., 2023). Gath et al. (2025) found that higher screen exposure between ages 2 and 4.5 years was linked to lower vocabulary, communication, writing, numeracy, and letter fluency, as well as increased peer problems in New Zealand children. By age two, more than 1.5 hours of daily screen use predicts below average language and educational performance (Brushe et al., 2024; Supanitayanon et al., 2020), alongside elevated peer relationship problems by age 4.5 (Golds et al., 2024; Zhao et al., 2022). Additionally, increased screen exposure may displace shared reading with potential implications for early literacy and reading skills (Alroqi et al., 2021).

A dose–response association was observed between greater screen time at age 1 year and developmental delays in communication and problem-solving at ages 2 and 4 years, with increasing exposure associated with elevated risk (Brushe et al., 2023). Results indicate that more than 1.5 hours of daily screen time at age 2 was associated with below-average language and educational ability and above-average levels of peer relationship problems at age 4.5 (Gath et al., 2025; Supanitayanon et al., 2020). Exposure to more than 2.5 hours of daily direct screen time was further associated with higher-than-average peer relationship problems at age 8 (Gath et al., 2025; Putnick et al., 2023). Operto et al. (2020) also found a general association between early screen use and later peer difficulties. Studies without formal dose-response modelling report similar associations between screen use and poorer developmental outcomes (Yamamoto et al., 2023).

Peer play time emerged as a significant protective factor and higher screen time indirectly increases developmental risk by displacing opportunities for social play (Gath et al., 2025). Greater peer play was associated with a lower likelihood of developmental delay, while higher screen time increased the likelihood of delay indirectly through reduced peer play opportunities (Putnick et al., 2023; Wan et al., 2021). These relationships were consistent across fine and gross motor development, communication, and personal–social domains (Samuelsson et al., 2022; Takahashi et al., 2023). These patterns appear across multiple developmental domains, including fine and gross motor skills, communication, and personal-social functioning (Gath et al., 2025; Operto et al., 2020; Putnick et al., 2023; Samuelsson et al., 2022; Wan et al., 2021; Zhao et al., 2022). Toddlers with higher overall screen exposure demonstrate

weaker tactile exploration and sensory-motor engagement, suggesting reduced participation in hands-on learning (Samuelsson et al., 2022; Teekavanich et al., 2022). Not using screens was a protective factor against lower neuro-psychomotor development (Mélo et al., 2025).

Screen use intersects with emotional development. When screens are used as a pacifier, they can replace verbal communication and physical comfort, fostering dependence on digital soothing and limiting the development of internal mood regulation skills (Bar Lev and Elias, 2020; Lin et al., 2020). Screen time was a risk factor for worse mental health in children with neuro psychiatric disorders during COVID (Olivia et al., 2021). Hesketh and Dodd (2023) reported that higher educational screen time (but not recreational screen time) was associated with poorer mental health among UK 2-year-olds. Cognitive outcomes show a comparable pattern. Several studies link early, regular screen exposure to poorer executive function and weaker cognitive and socio-emotional development, particularly among children with increasing screen-use trajectories (Gillioz et al., 2025; McHarg et al., 2020; Takahashi et al., 2023). Greater TV time negatively affected language and cognitive development in Korean children (Kim and Chung, 2021). Similar concerns arise in relation to language development and are observed cross-culturally: screen exposure may reduce children's access to a language-rich home environment (Brushe et al., 2024; Gath et al., 2025; Karbasi Amel et al., 2025; Supanitayanon et al., 2020), although one study suggests that joint media use with caregivers can mitigate some risks and even support language learning (Medawar et al., 2023).

Evidence from East Asian cohorts, including studies conducted in China, suggests that under specific conditions—such as limited duration, educational content, and caregiver involvement—screen use may be associated with neutral or even modest cognitive benefits (Xiao et al., 2025; Yue et al., 2025). Nevertheless, the broader literature points to risks of cognitive overload and reduced self-regulation when screen exposure is frequent or poorly scaffolded (McHarg et al., 2020; Takahashi et al., 2023). Importantly, caregiver interaction during screen use consistently predicts better cognitive, language, and socio-emotional outcomes (Xiao et al., 2025).

Maternal smartphone use during critical parenting periods negatively impacted mother-infant responsiveness and infant social-emotional development in the UK (Golds et al., 2025). Sim et al. (2025) found that maternal and child TV screen use at 1 year was related to poorer behavioral outcomes at 3 years, whereas mobile/tablet use was less associated (Sim et al., 2025). Screen use also correlates with behavioral and temperamental challenges, and Ventura et al. (2023) showed that children whose mothers used TV or mobile devices during mealtimes exhibited greater negative affectivity.

Overall, the evidence portrays a clear pattern: higher and earlier screen exposure is linked to developmental, cognitive, social, emotional, and physical challenges (Kracht et al., 2023). while protective factors—such as peer play and caregiver interaction—can buffer or reduce these risks (Putnick et al., 2023; Takahashi et al., 2023; Zhao et al., 2022).

Table 13: Studies included in the systematic review that have focused on child development

Author (year)	Country	Participants (n)	Age range/ group	Outcome	Findings
Al-Hosani et al. (2023)	United Arab Emirates	227 infants with language delay and 227 controls	12-48m (~70% 12-36m)	Delayed language development based on diagnosis	Device and TV use associated with greater odds of delay. Earlier device use onset, and higher TV use associated with delayed language development.
Alroqi et al. (2021)	Saudi Arabia	85	1–3 years (M = 24.92 months, SD = 7.67)	Language development	The amount of time toddlers spent with screens was higher than their engagement with reading. More than 40% of the children were never read to, and one quarter had no children's books at home.
Asikainen et al. (2021)	Finland	997 children	~18m, 24m	Child expressive vocabulary was assessed based on performance in laboratory	Small expressive vocabulary (<5 words at 18m, <20 at 24) was associated with high child screen time (>77 min/day) at 18 and 24m. At 24m, high parental screen time (>231 min/day) was associated with small expressive vocabulary, reading daily to them protective.
Bar Lev and Elias (2020)	Israel	10	3–24 months	Parental media use in routines; infant screen exposure; role of media in caregiving	Parents extensively exposed their children to screen devices. Parents used media as background 'babysitter,' 'pacifier,' and 'childcare toolkit.' Authors suggested an increase in parental awareness towards their instrumental use of media as part of their parenting routine, which may impart unhealthy media habits and affect their children's long-term development.
Brushe et al. (2023)	Australia	220	0–2 years	Adult words, child vocalisations, conversational turns	Results emphasise that most families do not meet current screen time guidelines, with many dramatically exceeding zero hours during the first two years of life and total screen time increasing with age. Furthermore, substantial differences in screen exposure between maternal education groups began as young as six months old. This

					may help explain one of the potential mechanisms driving inequalities in early childhood development.
Brushe et al. (2024)	Australia	220	0–2 years	Three measures of parent-child talk: adult words, child vocalizations, conversational turns	Findings of this study support the notion of technoference for Australian families, whereby young children's exposure to screen time is interfering with opportunities to talk and interact in their home environment.
Gastaud et al. (2023)	Brazil	470 infants	~18m	Developmental function assessed using BSID-III	Higher screen (TV/tablet) daily exposure (2h+) associated with lower cognitive domain score (<1h = 97.8, 1h = 95.3, 2h+ = 94.6).
Gath et al. (2025)	New Zealand	6,281	2, 4,5, 8 years (children assessed at these ages)	Language development, early educational skills, and peer social functioning	More than 1.5 hr. of daily direct screen time at age 2 was associated with below average language and educational ability and above average levels of peer relationship problems at age 4.5. Exposure to more than 2.5 hr. of daily direct screen time was associated with higher-than-average peer relationship problems at age 8.
Gillioz et al. (2025)	Switzerland	159	3-36 months (n=46 6–18 months; n=38 19–24 months; n=75 25–36 months	Sensory profiles	Excessive screen exposure may negatively affect sensory processing by limiting children's opportunities to engage in active, multisensory interactions that are essential for healthy development.
Golds et al. (2024)	UK	450	3–9 months	Infant development & mother–infant responsiveness	High maternal smartphone use was associated with lower responsiveness and increased developmental concerns.
Golds et al. (2025)	UK	450	3–9 months	Mother-infant responsiveness; infant social-	Suboptimal infant social-emotional development, additional children in the family, lack of appraisal support for mothers, as well as maternal smartphone use during

				emotional development, birth parity, perceived social support (appraisal), and likelihood of maternal smartphone use when the infant may be perceived as passive	critical periods of parenting all demonstrate a negative association with mother-infant responsiveness.
Hendry et al. (2022)	UK	203 children	0-36m	Executive function was assessed using EEFQ	Frequency of screen time associated with lower executive function and mediates link between SES and EF.
Hesketh and Dodd (2023)	UK	1079	2-4 years (age 2: n=319 [30%], age 3: 384 [36%], age 4: 376 [35%])	Internalising and externalising score from the Strengths and Difficulties Questionnaire (SDQ) and positive and negative affect scores from the Positive and Negative Affect Schedule for Children-P (PANAS)	Adventurous play was associated with better mental health, whereas high educational screentime was associated with poorer mental health, although effect sizes were small.

Karbasi Amel et al. (2025)	Iran	192	18-36 months (M=27.4, SD= 5.2 months)	Speech and language development / speech delay risk	Prolonged screen time significantly correlated with speech delay. Children with delays had mean exposure of 3.1 hours/day vs. 1.8 hours. Early media exposure increased risk.
Kim and Chung (2021)	Korea	1087	Screen use at 5.5 months to 87.9 months	Language, cognitive development	Negative association found between greater TV time and children's language, cognitive development.
Kracht et al. (2023)	USA	89	3, 12 and 24 months	Growth and development	Screen time increased between 12 and 24 months and was positively associated with fat mass index and negatively associated with development scores.
Lin et al. (2020)	Taiwan	161	18-36 months (M = 25.63, SD = 5.35)	Behaviour; Communication and Language	Young children who spent more time on touch screen devices were more likely to have emotional problems, anxious/depressive symptoms, somatic complaints, social withdrawal symptoms, attention problems, and aggressive behaviours, but not language delay.
McHarg et al. (2020)	UK	193	2-3 years (tracked)	Executive functions	Screen time at age 2 is negatively associated with the development of executive functions in toddlerhood from age 2 to 3, controlling for a range of covariates including verbal ability.
Medawar et al. (2023)	Argentina	465	18-36 months (children grouped by three age bands: 18-24 months, 25-30 months, 30-36 months)	Home literacy; joint engagement and scaffolding	TV exposure contributed negatively to vocabulary and, along with educational content, to sentence use. Shared reading and screen media experiences can be an opportunity for language stimulation, provided there is dialogue and joint engagement. Passive screen exposure and inadequate content may be detrimental for toddlers' language outcomes, probably by displacement of socially significant interactions.
Melo et al. (2024)	Brazil	849	0-12 years	QOL/ quality of life -related	The following variables were significantly associated with high scores of QOL: typical health status (OR

				family factors and the Pediatric Quality of Life Inventory (PedsQL™)	2.38; 95%CI 1.60-3.55; screen time ≤2 h/day (OR 1.62; 95%CI 1.17-2.24); social distancing considered as "easy" (OR 1.67; 95%CI 1.20-2.32), and stimulation of the child by the family (OR 1.93; 95%CI 1.08-3.45).
Olivia et al. (2021)	Italy	6,870 parents completed a survey for a total of 9,688 children and adolescents	18 years and under (age range: <1, 1–2, 3–5, 6–10, 11–13, 14–18 years)	Emotional and behavioural symptoms, as assessed by psychometric scales (BPSC, PPSC, PSC, CES-DC and SCARED, respectively) and lifestyle changes during home confinement	Residency in highly affected areas, a diagnosis of mood disorder, parental job loss, and screen time, were associated with a worsening of the depressive symptoms, whereas physical activity, talking with other people, playing with parents were protective activities. Screen time was also a risk factor for anxiety symptoms, while physical activity, reading and talking with other people were protective factors.
Operto et al. (2020)	Italy	260	8 and 36 months (M = 23.5, SD = 7.18)	Language skills	Longer time of exposure to digital devices was related to lower mimic-gestural skills in children from 8-17 months and to lower language skills in children between 18 and 36 months, regardless of age, gender, socio-economic status, content, and modality of use.
Putnick et al. (2023)	USA	3894	12, 18, 24, 30, and 36 months (assessments at these ages)	Reading and peer play time	Higher screen time between ages 1 and 3 years was indirectly associated with increased risk of developmental delay through reduced peer play time.
Samuelsson et al. (2022)	Sweden	34 (2-year-olds)	Groups of 2-, 4- and 5-year-olds	Play behaviour (digital vs non-digital)	Play with iPads was characterised as less ludic than play with other artefacts and deviated from age-typical norms, with reduced verbal interactions observed in early years settings.

Sim et al. (2025)	Australia	887	1-3 years (longitudinal)	Mother and child screen use (TechU-Q) at child's 1 year of age and child behaviour and development (Connors Early Childhood) at 3 years of age	Maternal and child screen use at 1 year of age appear only weakly related with child behaviour and development at 3 years of age. Maternal mental health is likely to have a more clinically meaningful relationship with child behaviour, but not development.
Supanitayanon et al. (2020)	Thailand	274	6, 12, 18 months, and 2 years (data were collected these ages)	Cognition or early learning composite (ELC)	Delayed introduction of screen media, appropriate levels of screen time, and increased verbal interaction during media use in the first 2 years of life were associated with better cognitive development in preschool-aged children.
Takahashi et al. (2023)	Japan	7097	1, 2 and 4 years (exposure measured at these ages)	Developmental delay assessed across 5 key domains: communication, gross motor skills, fine motor skills, problem-solving abilities, and personal and social skills	Greater screen time for children aged 1 year was associated with developmental delays in communication and problem-solving at ages 2 and 4 years.
Teekavanich et al. (2022)	Thailand	138	18-30 months (M=23.68 months, SD 3.87)	Energy intake, meal duration, and media use during feeding	Media use during feeding was associated with greater energy intake and longer meal duration. Children who regularly used media at mealtime were more likely to be obese (higher BMI-for-age).

					Children with longer total daily screen time and those with feeding difficulties were more likely to use media during meals regularly.
Ventura et al. (2023)	USA	77	19.4 ± 0.9 months	Mothers' television and mobile device (TV/MD) use and responsive feeding	Mothers' TV/mobile device use was associated with greater child temperamental negative affectivity and lower responsiveness to child cues.
Wan et al. (2021)	UK	327	6-24 months	Social-emotional functioning- SE competence; SE problems; risk of SE delay	While screen time predicted both SE/ SE/social-emotional competence and SE problems, reduced parent-infant play partially mediated the effect on SE competence.
Xiao et al. (2025)	China	1052	6 and 26 months (aged <12 or ≥12 months, <18 or ≥18 months, and <26 months)	ECD/Early Childhood Development outcomes (motor, cognitive, language, and socioemotional outcomes)	Early screen exposure (before 12 months) and longer screen time between 12 and 18 months were associated with increased risk of motor developmental delays. Caregiver interaction during screen use was associated with lower risk of cognitive and language delays and better socioemotional outcomes. The type of content and caregiver engagement appeared more influential on developmental outcomes than screen time duration alone.
Yamamoto et al. (2023)	Japan	57,980	1-3 years (longitudinal cohort)	Child developmental performance (developmental screening scores using Ages and Stages Questionnaire)	Increased TV/DVD screen time at ages 1 and 2 years was associated with lower developmental scores at ages 2 and 3 years, respectively. Higher screen exposure was linked to poorer developmental outcomes. Lower developmental scores were also associated with increased screen time among children whose mothers experienced psychological distress.
Yue et al. (2025)	China	1825	4–29 months	Cognitive and non-cognitive development	A substantial proportion of infants exceeded the screen time recommendations set by American Academy of Pediatrics (AAP). Screen exposure showed positive

					associations with cognition but negative associations with behaviour and non-cognitive outcomes.
Zhao et al. (2022)	China	152	6-72 months (longitudinal)	Cognitive development; Language development; Social-emotional development	Excessive screen time (i.e., early increasing and late-increasing trajectories vs. continued low) was associated with poorer cognitive and social-emotional development outcomes.

Discussion

Interventions

A significant amount of the literature we read discusses how the under 2s are using screen to levels that exceed existing guidance and for some they are far exceeding guidance, which will be delaying development across a range of measures (Alroqi et al., 2021; Brushe et al., 2023; Cartanyà-Hueso et al., 2021; Yue et al., 2025). The visibility/invisibility of guidance may have a partial role to play, but it is not the case that all parents are unaware of guidance. Many are aware but do not follow the guidance (Amaral de Andrade Leão et al., 2025; Li et al., 2022; Lin et al., 2020; Mota et al., 2024; Wang et al., 2023). In particular, those adults who already experience excessive screen time themselves are more likely to tolerate screen use for their young children (Schwarz et al., 2025; Wan et al., 2021). There was an absence of literature investigating the causes of caregiver hesitancy to follow screen time guidelines as a direct cognisant choice, which needs to be addressed. Though we do understand from the evidence that parents' individual circumstances such as balancing employment, household responsibilities, and fatigue lead them to be often relying on screens to occupy children, with screens acting as 'babysitters' (Bar Lev and Elias, 2020; Dikkala et al., 2022; Luvira and Photichai, 2025; Ribner and McHarg, 2021).

In the absence of a full understanding about how and why babies are experiencing screens to their detriment, we have also investigated what interventions currently exist to help parents adhere to and understand guidance. While there are many studies on using digital apps to try to influence maternal health and the outcomes of their infants, there are few peer reviewed published reports on interventions to reduce the digital screen time of infants. Ten studies published in the last five years discussed interventions ranging from a simple sticker (Schwarz, Krafft et al., 2025), remotely provided education (Lee et al., 2023), a telephone call and instructions (Pickard et al., 2024) through to multiple in person visits / group session (Askie et al., 2020; Beck et al. 2023; Bulduk and Güdücü Tüfekci, 2025; Hesketh et al., 2021; Zheng et al., 2022). In each case a reduction in child screen time was achieved, and in some studies the longevity of the impact on child health was demonstrated (Beck et al., 2023; Zheng et al., 2022). Access to non-digital stimulation such as toys was also found to be beneficial (Kracht et al., 2021), but not nursery school attendance, at least in Japan (Horiuchi et al., 2020). Being outdoors and away from the home setting also prevents screen time (Risica et al., 2022) and is consistently recognised as beneficial in terms of physical development and eye health (Morgan et al., 2021).

Table 14: Intervention studies included in the systematic review

Author (year)	**Country**	**Intervention**	**Participants (n)**	**Intervention age**	**Evaluation age**	**Control**	**Findings**
Askie et al. (2020)	Australia and New Zealand	6 to 8 visits / group sessions including on TV viewing	2,196	Antenatal to 6 months	Weight and height at 18 or 24 months	Usual nurse led health clinics ± newsletter	Lower body mass index and reduced TV viewing time.
Beck et al. (2023)	USA	Futuros Fuertes health education well-child visits in first year of life + two text messages per week reinforcement	96 low-income Latino infant-parent dyads	0-1 month	6, 12 and 15 months	Financial coaching	Increase in fruit intake was higher at 15 months. Breastfeeding rates were higher at 6-9 months. Mean daily screen time was lower at 6, 12 and 15 months.
Bulduk and Güdücü Tüfekci (2025)	Türkiye	Parents given education (group activities and telephone reinforcement) on	166	6 to 24 months	3-4 months post education	No extra education	Decreased TV viewing and better sleep time, time to fall asleep, night-

		digital device use for their children					time and daytime sleep characteristics, and total daily sleep duration.
Hesketh et al. (2021)	Australia	15-month group program promoting obesity-protective behaviours	398 mother-child dyads.	4 months	20 months	None – before and after assessment	Improving mother's behavioural knowledge bigg est contributor to reducing child television viewing.
Horiuchi et al. (2020)	Japan	Nursery school attendance	183	18 months	18 and 42 months	Children who did not attend nursery school	18-month-old children attending nursery school had no differences in electronic media usage.
Kracht et al. (2021)	USA	Home environment assessed for developmental stimulation, organisation and toys	141	6 months	24 months	Children who did not meet screen-time guidelines	Children who met the screen-time guideline lived in homes with more

							developmental stimulation and toys.
Lee et al. (2023)	USA	8 weeks theory-based educational videos, cooking tutorials and text messages	73, from low-income families	1 to 3 years	Immediately post intervention	Booklet about general nutrition recommendations	Increased fruit and vegetable intake and decreased use of screen time. Parents self-efficacy and comprehensive feeding practices improved more than controlled. No effect on child physical activity and sedentary behaviours, or parental nutrition knowledge and attitudes.

Pickard et al. (2024)	UK	7-week parent-administered removal of screen time In hour before bed (PASTI) in exchange for bedtime box	105 1:1:1 allocation	16-30 months	Immediately post intervention	1. bedtime box with no mention of screen time; 2. no intervention	PASTI showed small to medium improvements in objectively measured sleep efficiency, night awakenings and (vs no intervention only) reduced daytime sleep, but no effect on attention.
Schwarz et al. (2025)	Germany	Screen-free till 3 years stickers in child screening booklets	4021 parents	6-7 months	10-36 months	1/3rd of practices although analysis not by practice	High screen media use by parents linked to higher screen media use by children and negative impact on child development. Time spent in nature

							positively associated with child development.
Zheng et al. (2022)	Australia	Six education sessions over 15 months helping parents to promote a healthy diet, physical activity and limit sedentary behaviour in their infants.	542	4 months	1.5, 3.6 and 5.0 years	Usual care from maternal child health nurse and six newsletters regarding aspects of child health or development unrelated to intervention	Lower 'Discretionary consumption and TV' lifestyle pattern score than the control group at all time points. No differences in 'Fruit, vegetables and outdoor' lifestyle pattern score.

The Need for a Nuanced Understanding

The effects of early screen exposure on children are increasingly understood as multifactorial, context-dependent phenomena, shaped by intersecting socio-demographic, familial, and motivational influences (Brushe et al., 2023; Gillioz et al., 2024; Yue et al., 2025). Current evidence indicates that universal, prescriptive limits are potentially insufficient on their own; instead, research supports the possible implementation of personalised, developmentally responsive, and appropriately restrictive screen-use plans that caregivers can calibrate to the needs and characteristics of individual children and their families (Paoletti et al., 2025; Pizzi et al., 2025). For instance, parental educational attainment has been repeatedly associated with both the quantity and quality of children's media exposure. Higher educational levels tend to predict lower overall screen time or more structured, intentional media practices, suggesting that socio-educational gradients shape media-related decision-making (Brushe et al., 2023; 2024; Pizzi et al., 2025). Caregivers managing employment demands, domestic workloads, and fatigue frequently use screens as functional childcare tools, effectively substituting for direct supervision or engagement (Bar Lev and Elias, 2020). Individual circumstances—such as limited social support, economic strain, or parental stress—can further intensify reliance on digital media as a regulatory or occupying device (Bar Lev and Elias, 2020; Dikkala et al., 2022; Luvira and Photichai, 2025; Ribner and McHarg, 2021).

Parents' motivations for media use—including entertainment, soothing, or educational intentions—constitute an additional layer of influence, with measurable implications for children's socio-emotional and cognitive development (Chamam et al., 2024; Melchior et al., 2022). When considered alongside the clustering of risk and protective factors in new mothers, these motivational patterns help delineate the specific support needs of caregiver–infant dyads and inform the design of early-years interventions (Paulus et al., 2024; Pizzi et al., 2025). Broader socio-economic conditions and the extent of parental engagement in alternative, developmentally enriching activities further shape developmental trajectories, reinforcing the need for accessible, context-sensitive family support systems (Brushe et al., 2023; 2024). Across the literature, a consistent empirical pattern emerges: parent–child interactions are more frequent, more linguistically complex, and more developmentally generative during shared reading, play, and other interactive activities than during co-viewing of screen content. This underscores the importance of promoting interactive, relationally rich experiences as a counterbalance to early screen exposure (Golds et al., 2024; Huang et al., 2024).

Table 15: Studies included in the systematic review relevant to the need for a nuanced understanding on screen time

Author (year)	**Country**	**Participants (n)**	**Age range/ group**	**Outcome**	**Findings**
Bar Lev and Elias (2020)	Israel	10	3–24 months	Parental media use in routines; infant screen exposure; role of media in caregiving	Parents used media as background 'babysitter,' 'pacifier,' and 'childcare toolkit.
Brushe et al. (2023)	Australia	220	0–2 years	Adult words, child vocalisations, conversational turns	At six months, children were exposed to an average of 1hr, 16 min (SD = 1hr, 36 min) of screens per day, increasing to an average of 2 hr, 28 min (SD = 2 hr, 4 min) by 24-months. Some children at six months were exposed to more than 3 hr of screen time per day.
Brushe et al. (2024)	Australia	220	0–2 years	Parent–child talk (adult words, child vocalisations, conversational turns)	Greater screen time was associated with reduced parent–child talk, including fewer adult words, child vocalisations, and conversational turns.
Chamam et al. (2024)	Switzerland	52	12-36 months (M=22 months)	Interactive quality and communication	Parental distraction negatively affects the quality of parent–child interaction and the frequency of communicative bids, regardless of whether the distraction is digital or non-digital.

Dikkala et al. (2022)	India	80	9–36 months (majority 12–24 months)	ASD/autistic traits	The majority of the toddlers (36.2%) were screen viewing for about 1–2 hours per day; 30% of the sample had 2–4 hours of screen time daily, and 21.2% experienced more than 4 hours of screen media exposure.
Huang et al. (2024)	Singapore	4,617	Under 2 years	Motor, language, and social development	Early screen exposure was associated with poorer developmental outcomes, particularly in language, social behaviour, and fine motor skills.
Gillioz et al. (2024)	Switzerland	135	6–36 months	Tactile exploration skills	Higher screen exposure was associated with weaker tactile exploration and less age-appropriate exploration strategies, with socioeconomic factors and parental engagement influencing outcomes.
Golds et al. (2024)	UK	450	3–9 months	Infant socio-emotional development; mother–infant responsiveness; maternal mental health	Higher maternal smartphone use and lower responsiveness were observed in at-risk dyads, highlighting the need for tailored early interventions.

Luvira and Photichai (2025)	Thailand	247	18 months	Electronic media exposure	52.2% of 18-month-old children were raised with the assistance of electronic media. Mothers reported using electronic media to support child-rearing. Media use was associated with family characteristics such as marital status, unemployment, and household size.
Melchior et al. (2022)	France	12,950	2 years	ASD risk; neurodevelopment	Screen exposure showed a complex, non-linear association with ASD risk, suggesting multiple contributing factors.
Paulus et al. (2024)	Germany	3,035	0–3 years (M = 17.37 months, SD = 13.68)	Family factors; media use	Higher maternal media use, problematic internet use, and lower education were associated with increased digital media use among young children.
Paoletti et al. (2025)	Italy	187	4–8 months	Socio-emotional, language, and cognitive development	Interactive and shared media use supported development, whereas high and independent screen use was associated with poorer outcomes.
Pizzi et al. (2025)	Italy	35,550	0–2 years	Screen exposure	Most infants, particularly from lower SES backgrounds, were exposed to screens during a critical developmental period, potentially disrupting responsive caregiving and early development.

Ribner and McHarg (2021)	USA/UK	303	4, 14, 24 months	Predictors of media use	Children spend more time engaging with digital media as they grow older; however, growth mixture models reveal most children fit into one of two classes: One group of children (High Media Users; 52.2%) engages with a substantial amount of digital media, whereas the other (Low Media Users; 48.8%) engages with relatively little.
Yue et al. (2025)	China	1,825	4–29 months (longitudinal)	Developmental outcomes (cognitive and non-cognitive)	Screen exposure was positively associated with cognitive development but negatively associated with behavioural and non-cognitive outcomes.

Conclusion

Key Findings

Cultural Findings

- Screen use has become deeply embedded in everyday parenting routines, through smartphone use (Luvira and Photichai, 2025), television (Pizzi et al., 2025), and increasingly tablet use (Gago Galvagno et al., 2025).
- More than half of children are already using screens by 12 months, and over a third are exposed as early as six months (Brushe et al., 2023; Gago Galvagno et al., 2024; Lev and Elias, 2020; McArthur et al., 2020).
- Parents and caregivers screen habits and behaviours influence young children's media use. Factors such as screen accessibility and role modelling behaviours of parents are strong indicators of the likelihood of screen use by babies (Chamam et al., 2024; Lin et al., 2020; Schwarz et al., 2025; Webb et al., 2024).
- Parental educational attainment exerts an influence on both the quantity and structure of children's media use (Krogh et al., 2021; Melchior et al., 2022; Paulus et al., 2024). Higher education levels are repeatedly associated with lower overall exposure, greater adherence to guidance, and more intentional or regulated patterns of screen engagement (Brushe et al., 2021; 2023; Pizzi et al., 2025).
- A small but significant group—around 9.5%—show persistently high use at the age of two, averaging about four hours per day. Notably, around 20% of children use screens with no parental interaction at all (Dikkala et al., 2022; McArthur et al., 2020; Ribner and McHarg, 2021).
- Screens are taking on roles traditionally aligned with those of caregivers and screens are used to comfort under 2's through digital soothing, impacting mood regulation, emotional development and family bonds (Bar Lev and Elias, 2020; Lin et al., 2020).

Health Findings

- Sleep patterns appear to be adversely impacted by screen time (Lestari et al., 2020; Kahn et al., 2021a; 2021b; 2021c; Mutlu and Dinleyici, 2024)
- Screen time around meal time is a common occurrence and has an association with poor eating habits. Further associations have been made between screen time use and unhealthy lifestyle habits leading to increased adiposity in later childhood (Azab et al. 2025; Kracht et al., 2023; Ma et al., 2025; Marbac et al.

2020; Mutlu and Dinleyici, 2024; Saldanha-Gomes et al., 2021; Saldanha-Gomes et al., 2022; Saito and Kondo 2023; Ventura et al., 2023).

- Screentime is linked to a future risk of chronic constipation (Hotta et al., 2025).

Psychological Findings

- Certain types of screen media can cause over stimulation or cognitive overload (McHarg et al., 2020; Takahashi et al., 2023).
- Several studies point toward a potential increase in ASD-like symptoms among children with high levels of early screen use (Dikkala et al., 2022; Heffler et al., 2020).
- When screens are used as a pacifier, they can replace verbal communication and physical comfort, fostering dependence on digital soothing and limiting the development of internal mood regulation skills (Bar Lev and Elias, 2020; Lin et al., 2020).
- Providing screen media as a coping mechanism for a child places them at higher risk of problematic use and emotional reactivity (Coyne et al., 2021).

Social and Relational Findings

- Technoference or time spent engaging with screens at the expense of physical, social and emotional interactions with children under 2 is significant and happens at multiple points through the day (Ferjan Ramírez et al., 2021; Zurcher et al., 2020).
- Parents who use screens to a higher extent are more accepting of their under 2's screen use, suggesting that for some families a cycle of PMU can occur (Schwarz et al., 2025; Wan et al., 2021).
- Rich forms of caregiver/parent interaction with babies and under 2s including physical, gestural and vocal communication are displaced by screen time and this negatively impacts cognitive, motor, language, social and emotional development (Chamam et al., 2024; Krapf-Bar et al., 2022; Lin et al., 2020).
- Studies show that screen time under 2, negatively impacts peer relationships and for children as they get older (Gath et al., 2025; Golds et al., 2021; Zhao et al., 2022).

Developmental Findings

- Screen time under 2, negatively impacts education performance in later life (Alroqi et al., 2022; Brushe et al., 2024; Supanitayanon et al., 2020).
- The evidence portrays a clear pattern: higher and earlier screen exposure is linked to developmental, cognitive, social, emotional, and physical challenges (Kracht et al., 2023).
- The impacts on development that occur from screentime for the under 2s have been shown to have measurable impacts on children in later life and

development is delayed (Brushe et al., 2023; Brushe et al., 2024; Golds et al., 2021; Supanitayanon et al., 2020; Zhao et al., 2022).

- Screen time displaces peer play and outdoor play, negatively impacting physical and eye health (Morgan et al., 2021).
- Screen time can lead to delayed language and cognitive development (Kim and Chung, 2021; Gath et al., 2026).
- Problematic media use reduces social-emotional development and can be a cause of negative mental health impacts (Hesketh and Dodd, 2023; Kracht et al., 2023; Golds et al., 2025).
- Screen use can lead to worse behaviour and temperament (Sim et al. 2025; Ventura et al., 2023).

Parent/Caregiver Findings

- Individual circumstances—such as limited social support, economic strain, or parental stress—can further intensify reliance on digital media as a regulatory or occupying device (Dikkala et al., 2022; Bar Lev and Elias, 2020; Luvira and Photichai, 2025; Ribner and McHarg, 2021).
- Daily stressors for mothers lead to increased technology use, but technology is not effective in reducing stress (Wolfers et al., 2023; Zurcher et al., 2020)
- Technology use increases throughout pregnancy (Muskens et al., 2023; 2024; Wade-Bohlever et al., 2024) and does not fall post-pregnancy (Wade-Bohleber et al., 2024).
- Results have shown that there are moderate associations between greater tech use and low mood amongst pregnant women (Bingol et al., 2024; Guo et al., 2025; Kiyak et al., 2024; Ma et al., 2024; Muskens et al., 2023; Samra et al., 2024; Sanli et al., 2025; Smith et al., 2020; Wade-Bohleber et al., 2024; Wang et al., 2023; Yang et al., 2024; Yildirim et al., 2022; Zeeni et al., 2023; Zhou et al., 2021).
- Levels of technology (especially social media) by parents for seeking information about pregnancy and childbirth were commonly reported in these studies (Bingol et al., 2024; Lee and Lee 2022; Li et al., 2020).
- Two studies found problematic use (internet addiction, media absorption) were associated with lower attachment security among parents (Linder et al., 2021; Sabha et al., 2022).

Implications for Future Research

Our strategy has been to help underpin future research with a clear identification of where knowledge exists and where there are gaps, specifically related to the identification of risk zones and where possible thresholds for screen use may be. As this systematic review has demonstrated, risk zones and thresholds can only be understood through an interdisciplinary lens. Thresholds can be defined as the points at which screen use turns from utility into dis-utility, or where behaviours that may have begun as functional, become harmful. Through the understanding of threshold points, public concern over potential harms caused by screen use, can be adequately measured, recognised and subsequently mitigated against. This systematic review is the first step towards generating reliable evidence-based guidance for parents and caregivers. The undertaking of this multidisciplinary systematic review focussed around understanding the causal effects of screen time on children in relation to specific contexts. Nuanced impacts on a baby's screen time include the social/cultural background of the child, the devices used and the content they are exposed to. By recognising where possible the existing literature (or absence) on the unequal impacts on different groups based on age, gender, disability, socio-economic status, ethnicity, family structure and geographies, of passive and active screen time, whilst looking through the lenses of different academic disciplines, we have helped to lay the foundational work for further research. In summary of our contribution to the academy we now list the key research gaps and our suggestions for future directions of study.

Research Gaps

There are significant gaps in current literature that prevent the fullest progress from being made, and we assert that these gaps are often hampered by the lack of interdisciplinarity. Rather than waiting for multiple studies to be completed in order to address these gaps, a small number of interdisciplinary studies or a single large multidisciplinary study would be recommended. Despite over thirty years of screen-based research, there have been no multidisciplinary studies investigating the evidence-based causes and impacts of screen time.

- There is a need for more accurate and nuanced measures of screen time (studies often rely on parental recollections and may not consider device type/ working distance etc, which is relevant to visual effects).
- There is an opportunity to assess the economics of different parental screen time awareness initiatives on future child health metrics (including obesity, sleep, ocular health, cognitive development and behaviour).

- Future research could evaluate the impact of changes in tech company messaging on viewing below the age of 2 years on parental awareness and child health metrics.
- Studies could examine the link between addiction behaviours in teenagers (including gaming) and screen use by parents and children in the first 1001 days. This is especially timely as there will soon be cohort studies that have collected media use from birth into early adolescence.
- There is nothing on UK/ British children regarding visual effects, and little on modern device usage (some are considering device usage from 20+ years ago when the types of devices have changed).
- There is a need to assess ocular surface health and refractive development through large scale longitudinal studies that have captured screen time use before that age of 2 years.
- For refractive error, there is a need for appropriate measures of refraction, ideally cycloplegic autorefraction to be better understood.
- Further, well-designed, prospective studies into RF-EMF with accurate exposure assessment would be needed to clarify associations and potential mechanisms.
- More rigorous work is needed to clarify the role of screen time in early life as a risk factor for myopia development.
- More research into the parental choices (or lack of them) in regard to screen time for the under 2s is needed, including investigating potential hesitancy towards the following of guidance.
- The academy needs a better understanding of trusted voices for parents/caregivers and the influence of government advice, peer pressure and technology providers.
- Researchers could collect more detailed qualitative data on the impact of modern hectic lifestyles on parenting techniques for the under 2s.
- Further research is needed on the subject of unequal impacts upon families from different ethnicities.
- Further research is needed on the subject of unequal impacts upon families experiencing disabilities and SEN/Special Educational Needs.
- The impact of educational background of parents needs further research to understand if education is a causal factor of screen time regulation in the home.
- There are few peer reviewed published reports or coordinated approaches on interventions to reduce the digital screen time of under 2s.
- The potential impacts of AI on baby and infant development is a new area of study that requires detailed exploration.
- There is very little research on problematic use in infancy, and most of it uses data from a single large study. There is a particular need for qualitative research to understand the core concerns raised by parents when they discuss addictive or problematic use, and how these might map onto concepts used in preschool

children, pre-adolescents and young adolescents. Recent attempts to describe this as 'affinity' might signal how this can be achieved.

- Measures that assess problematic media use in infants need to be empirically validated. Existing measures (i.e., PMUM-SF) can be validated using existing datasets.
- The growing use of ecological momentary assessment (EMA) and experience sampling (ESM) studies should be encouraged and supported, as these designs are likely to be the most valuable in answering critical questions where existing findings have been equivocal.
- Further research is required to determine whether problematic and non-problematic technology use during pregnancy is more prevalent than the general population, either through primary data collect or a focused systematic review.

Implications for Policy and Practice

Since early screen use can displace language rich interactions, interventions designed to promote early language development should include explicit guidance on managing screen time (Chamam et al., 2024; Melchior et al., 2022; Paulus et al., 2024). Encouraging parent–child reading away from digital screens is particularly valuable, as shared reading not only enriches language input but may also buffer potential negative effects of screen exposure on brain network development and socio-emotional competence (Golds et al., 2024; Huang et al., 2024).

The growing body of evidence shows that early screen exposure is shaped by complex, interacting contextual factors (Brushe et al., 2023; Gillioz et al., 2024; Yue et al., 2025). Research consistently demonstrates that infants' media environments are not uniform; they vary according to parental educational attainment, socio-economic conditions, household routines, and the motivations that drive caregivers' media use (Brushe et al., 2023; Brushe et al., 2024; Chamam et al., 2024; Melchior et al., 2022; Pizzi et al., 2025). These findings collectively highlight the possible need for a structured, evidence-informed tool that enables parents, caregivers, and professional services to systematically identify risk-enhancing conditions and tailor guidance to the developmental needs of individual infants. A tool that is capable of assessing a baby's screen time risks could be developed as an option to operationalise current research by translating academic insights into a practical, accessible decision-support instrument.

Such a tool could be further justified through those studies which show that caregivers' lived circumstances—including employment pressures, fatigue, limited support networks, and household complexity—can substantially increase reliance on screens as a regulatory or supervisory aid (Bar Lev and Elias, 2020; Dikkala et al., 2022; Luvira and Photichai, 2025; Ribner and McHarg, 2021). When combined with evidence that

parent–child interactions are richer, more linguistically complex, and more developmentally generative during shared reading and play than during co-viewing (Huang et al., 2024; Golds et al., 2024), the need for a structured assessment perhaps becomes clear. A *Baby's Screen Time Risk Assessment* would help identify clusters of risk and protective factors in caregiver–infant dyads (Paulus et al., 2024; Pizzi et al., 2025), enabling early-years practitioners to provide targeted support, guide families toward interactive alternatives, and intervene proactively where developmental vulnerabilities may be emerging. In this way, the tool would serve as a bridge between research and practice, supporting families across diverse contexts to make informed, developmentally attuned decisions about early screen exposure.

Parents of infants under two are increasingly navigating environments where digital screens are ever-present, yet the evidence shows that many babies are being exposed to screen levels that exceed recommended guidance, with some experiencing exposure far beyond what is developmentally optimal (Alroqi et al., 2021; Brushe et al., 2023; Cartanyà-Hueso et al., 2021; Yue et al., 2025). While awareness of guidance is not the primary barrier—many parents know the recommendations but struggle to follow them (Amaral de Andrade Leão et al., 2025; Li et al., 2022; Lin et al., 2022; Mota et al., 2024; Wang et al., 2023)—the literature suggests that adults who themselves experience high screen use are more likely to permit similar patterns for their infants (Schwarz et al., 2025; Wan et al., 2021). Encouraging positive alternatives therefore requires supporting families to build sustainable routines that fit within the realities of daily life. Simple, practical shifts—such as creating short periods of shared play, reading, singing, or sensory exploration—can offer babies rich developmental input while giving caregivers moments of meaningful connection. Recognising that many parents rely on screens due to fatigue, work pressures, or competing responsibilities (Dikkala et al., 2022; Lev and Elias, 2020; Luvira and Photichai, 2025; Ribner and McHarg, 2021), supportive messaging should focus on achievable steps rather than idealised expectations, helping families to feel empowered rather than judged.

Evidence from intervention studies shows that parents can successfully reduce their babies' screen exposure when provided with accessible, non-digital alternatives and clear, supportive guidance. Across a range of approaches—from simple prompts such as stickers (Schwarz et al., 2025) to remote education (Lee et al., 2023), brief telephone support (Pickard et al., 2024), and multi-session group programmes (Askie et al., 2020; Beck et al., 2023; Bulduk and Güdücü Tüfekci, 2025; Hesketh et al., 2021; Zheng et al., 2022)—reductions in infant screen time were consistently achieved, with some interventions demonstrating lasting benefits for child health (Beck et al., 2023; Zheng et al., 2022). Positive alternatives such as access to non-digital toys (Kracht et al., 2021), time spent outdoors (Risica et al., 2022), and opportunities for physical movement and natural light exposure—shown to support both physical development and eye health (Morgan et al., 2021) - offer families practical ways to replace passive screen viewing

with enriching experiences. Encouraging parents to incorporate small, enjoyable, screen-free moments throughout the day helps build sustainable habits that benefit both caregiver wellbeing and infant development, reinforcing that reducing screen time is not about restriction alone but about creating richer everyday experiences.

Mitigating Risks for Babies

Some under 2s and their caregivers may experience heightened vulnerability to early and frequent digital screen exposure due to the interaction of complex contemporary lifestyles and the pervasive presence of networked devices. In contexts characterised by demanding work schedules, constrained social support, or heightened caregiving pressures, screens can become an expedient tool for soothing, occupying, or managing daily routines. However, beyond the *baseline* digital environment typical of modern family life, specific risk-related phenomena may indicate an elevated likelihood of developmental or relational disruption. These patterns should be understood not as individual shortcomings but as structural and situational pressures that shape how families navigate ubiquitous digital technologies. To undertake a *Baby's Screen Time Risk Assessment* as recommended by the research team, considerations of heightened risk that may require mitigation could include:

- Screen time increases with age
- Screen time Increases at home
- Screen time can increase at weekends
- Family/caregiver screen time dictates baby screen time
- Devices in bedrooms increase screen time
- Touch screen devices can negatively impact social interaction and negatively impact sleep more
- Screens used for education and learning may be considered beneficial, but also present risks
- Screens used as pacifiers or to distract/occupy the baby affects mood and emotional regulation
- Babies left unsupervised with screens leads to problematic use
- Screentime with meals impacts health outcomes

By calculating measures for what constitutes low, medium and high-risk behaviours for each of the identified risk areas, it would be possible for those undertaking a risk assessment to generate a score-based assessment of the extent to which specific

babies are at risk of harms from screen times. Based on a combination of the total accumulated score and the individual category measurements, it is anticipated that mitigations against identified risks and potential harms can then be discussed and implemented. As a team, iADDICT are actively pursuing research around developing such an aid for professionals and parents alike.

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