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The Impact of Gadget Use During Pregnancy: A Systematic Literature Review (SLR)

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ABSTRACT

Background: The widespread use of mobile phones and electronic media devices (EMDs) has raised public health concerns, particularly regarding their potential effects during pregnancy. Pregnant women may be at increased risk of adverse maternal and fetal outcomes due to exposure to electromagnetic fields (EMFs) and prolonged screen time. Despite the growing body of research, comprehensive syntheses specifically addressing gadget use during pregnancy remain limited.

Purpose: This systematic review synthesizes evidence on the effects of gadget use during pregnancy on maternal health and fetal development.

Methods: This study employed a systematic literature review approach guided by the PRISMA framework. Relevant literature was retrieved from the Scopus and Google Scholar databases using specific keywords related to gadget use and pregnancy. The inclusion criteria comprised peer-reviewed articles published between 2015 and 2025, written in either English or Indonesian, that involved pregnant women and examined physical, mental, or developmental outcomes. The quality of the 19 selected studies was evaluated using the Mixed Methods Appraisal Tool (MMAT), and data extraction covered study design, outcomes, and key implications.

Results: Nineteen studies met the inclusion and quality criteria, comprising mostly quantitative non-randomized designs. The findings show that excessive gadget use during pregnancy—particularly prolonged screen exposure and mobile phone use—is associated with increased maternal anxiety, depression, hypertensive disorders, lower birth weight, shortened gestational periods, and developmental issues in children, including speech delays and poor motor skills. However, a few studies reported no significant cognitive impact on offspring.

Conclusion: Prolonged electronic device use during pregnancy has been associated with adverse maternal and fetal health outcomes. Given the potential risks, healthcare providers should recommend limiting screen exposure and developing clearer guidelines for safe gadget use during pregnancy. Further research is needed to define exposure thresholds and explore long-term impacts on child health.

Keywords: Pregnancy; Gadget Effect; Gadget Use; Fetal Development; Maternal Health

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BACKGROUND

In the modern era, electronic gadgets, particularly mobile phones and wireless devices, have become integral to daily life, including among pregnant women. Recent global data show that women's mobile internet adoption has increased across low- and middle-income countries, with more women now using mobile internet than ever before. Although the smartphone gender gap has narrowed to 13%, the overall gender gap in mobile ownership remains at 8% (GSMA, 2024). This rising connectivity underscores a critical public health concern: exposure to electromagnetic fields (EMFs) emitted by these devices has become nearly unavoidable, even during pregnancy—a period of heightened physiological sensitivity.

Mobile phones emit radiofrequency radiation (RFR), a form of non-ionizing radiation that may influence maternal health and fetal development (Emre et al., 2021). The number of smartphone users has risen dramatically over the past decade, from 1.01 billion in 2014 to 4.88 billion in 2024 (Turner, 2025). Such widespread exposure raises questions about the potential biological effects of RFR during pregnancy. Several studies have examined associations between maternal mobile phone use and pregnancy outcomes, including birth weight, gestational duration, and fetal heart rate (FHR). Some have reported negative correlations between maternal phone use and newborn anthropometric measures such as birth weight and head circumference (Farhan et al., 2016; Kömürcü Karuserci et al., 2019). Other studies have linked prolonged RFR exposure to oxidative stress and DNA damage in placental and cord blood samples, which could impair fetal growth (Bektas et al., 2020). Given the fetus's high radiosensitivity, these findings warrant careful consideration (Sreetharan et al., 2017).

However, the scientific evidence remains inconsistent. Experimental studies suggest that prenatal RFR exposure may alter fetal brain structure and function (Verreet et al., 2016), yet reviews such as Verschaeve (2017) have shown that results vary widely depending on study quality. While 85% of reviewed studies reported harmful effects, many suffered from methodological weaknesses or were published in low-quality journals; in higher-quality studies, adverse findings were less frequent or less pronounced. Similarly, Ashrafinia et al (2021) found mixed results regarding maternal phone use and child outcomes—some associations with behavioral or emotional problems in later childhood, but no consistent effects on psychomotor or cognitive development. Variations in exposure duration, outcome measures, and confounders such as maternal obesity contribute to these inconsistencies (Saadia, 2018).

Despite extensive research, a clear understanding of how mobile phone and wireless device use affects pregnancy remains lacking. Existing studies often address isolated outcomes or focus on general EMF exposure without integrating biological, behavioral, and environmental dimensions. This fragmentation leaves a significant knowledge gap regarding how modern digital habits collectively influence maternal and fetal health.

Therefore, this systematic literature review aims to synthesize current evidence on the effects of gadget use, particularly mobile phones and wireless devices, on maternal health, fetal

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development, and birth outcomes. It seeks to clarify inconsistencies in the literature, identify potential mechanisms such as oxidative stress, and evaluate how combined factors, including EMF exposure and screen time, may influence pregnancy. The review ultimately provides a more comprehensive understanding of how digital exposure shapes maternal–fetal well-being and supports the development of evidence-based safety guidelines for pregnant populations**.**

OBJECTIVE

The objective of the research states is to systematically review and synthesize existing evidence on the impact of gadget use—particularly mobile phones and electronic media devices (EMDs)—during pregnancy on maternal physical and mental health, as well as fetal and child developmental outcomes.

METHODS

Search Strategy

A comprehensive search was conducted across Scopus and Google Scholar using the following keywords: ("Gadget use" OR "Smartphone exposure" OR "Electronic Media Device (EMD) usage" OR "Electronic screen exposure") AND ("Pregnancy" OR "Prenatal" OR "Pregnant Woman") AND ("Health effects" OR "Complications"). Moreover, this study considers the potential for overlap, wherein an article might be cataloged in multiple scientific databases. The search was limited to peer-reviewed articles published between 2015 and 2025 in English-language journals.

Criteria

In this systematic literature review, the selection of articles was based on the following inclusion and exclusion criteria:

Inclusion Criteria:

- Studies discussing the use of gadgets (smartphones, tablets, etc.) during pregnancy.
- Articles published in the last 10 years.
- Studies written in English or Indonesian.
- Studies with quantitative, qualitative, or mixed-method designs.

Exclusion Criteria:

- Reviews, conference abstracts, or case reports.
- Non-scientific publications or opinion pieces.
- Studies not relevant to the topic or target population (e.g., studies on animals, children, males, or non-pregnant populations).

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– Studies with incomplete or insufficient data for analysis.

These criteria were applied to ensure that the selected studies are directly relevant to the research question and meet the necessary standards for quality and reliability.

Screening and Selection Process

The literature selection process was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and systematic study inclusion. The process consisted of two main stages, namely screening and eligibility, conducted across the Scopus and Google Scholar databases as well as through handsearching. After removing duplicates and excluding studies that did not meet the criteria, a total of 19 articles were included in the final synthesis. The detailed flow of the study selection process is presented in the PRISMA diagram (Figure 1).

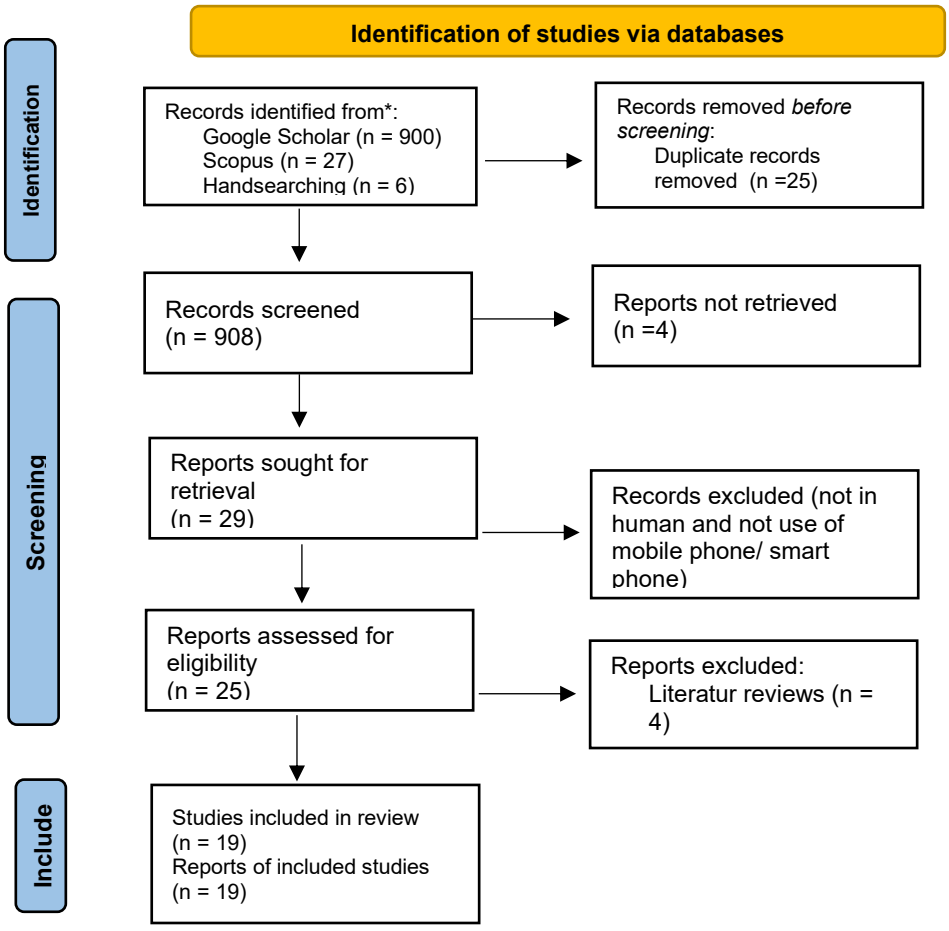

Figure 1. PRISMA Diagram for inclusion of reviews

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Quality Appraisal

After the screening and eligibility stages, the studies that passed the selection were further assessed using the Mixed Methods Appraisal Tool (MMAT) to ensure the quality of the research methodology used. Quality assessment is an important step in a Systematic Literature Review (SLR) to identify studies with valid and reliable approaches and to avoid bias in data synthesis. MMAT was chosen because it can assess various research designs, including qualitative, quantitative (experimental and non-experimental), and mixed-method studies (citation).

The quality assessment was conducted using the Mixed Methods Appraisal Tool (MMAT), applying five criteria according to the methodological design of each included study. Since no qualitative studies were identified, the assessment focused on quantitative and mixed-method studies. Quantitative studies were evaluated based on measurement validity, control of variables, and clarity of research design, while mixed-method studies were assessed on the integration and complementarity between their quantitative and qualitative components. Each study was rated on a scale from 0 to 5, with higher scores indicating better methodological quality.

Two independent reviewers screened the titles, abstracts, and full texts of all identified studies to ensure objectivity. Any disagreements regarding study inclusion or quality assessment were resolved through discussion to reach consensus, or by consulting a third reviewer when necessary. Studies with a score below 2/5 were excluded from the synthesis due to significant methodological weaknesses. The results of the quality assessment of the studies using MMAT are presented in Table 1 below:

Table 1. Study Quality Assessment Using MMAT

Code	Author, Year	Type of Study	MMAT Score	Decision
R1	Saadia (2018)	Quantitative randomized controlled trial	5/5	Yes
R3	Bektas et al (2020)	Quantitative nonrandomized	3/5	Yes
R4	Choi et al (2017)	Quantitative nonrandomized	5/5	Yes
R5	Bektas et al (2018)	Quantitative nonrandomized	5/5	Yes
R6	Zhan et al (2024)	Quantitative nonrandomized	3/5	Yes
R7	Kömürcü Karuserci et al (2019)	Quantitative nonrandomized	3/5	Yes
R8	Plakas et al (2022)	Quantitative nonrandomized	3/5	Yes

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Code	Author, Year	Type of Study	MMAT Score	Decision
R9	Bektas et al (2022)	Quantitative nonrandomized	4/5	Yes
R10	Bektas et al (2021)	Quantitative nonrandomized	5/5	Yes
R12	Zarei et al (2019)	Quantitative nonrandomized	4/5	Yes
R13	Tang et al (2024)	Quantitative nonrandomized	5/5	Yes
R14	Yang et al (2024)	Quantitative nonrandomized	5/5	Yes
R15	Chen et al (2020)	Quantitative nonrandomized	4/5	Yes
R16	Çöl et al (2021)	Quantitative nonrandomized	3/5	Yes
R17	Emre et al (2021)	Quantitative descriptive	3/5	Yes
R18	Boileau et al (2020)	Quantitative nonrandomized	5/5	Yes
R19	Lu et al (2017)	Quantitative nonrandomized	3/5	Yes
R20	Tsarna et al (2019)	Quantitative nonrandomized	2/5	No
R21	Birks et al (2017)	Quantitative nonrandomized	2/5	No
R22	Sudan et al (2018a)	Quantitative nonrandomized	5/5	Yes
R23	Papadopoulou et al. (2017)	Quantitative nonrandomized	4/5	Yes

Based on the table above, 19 of 21 studies established methodological standards with the lowest score is 3. There are two studies excluded because of their low score. By applying MMAT as the quality appraisal method, this research ensures that only high-quality studies are analyzed in the literature synthesis, thereby making the findings more reliable and contributing to the development of evidence-based policies and practices in the field under study.

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RESULTS AND DISCUSSION

Data Extraction Process

Data extraction was carried out by collecting key elements from the 19 studies that passed the selection process. The information extracted includes study identity, the methodology used, the population studied, the intervention or main focus of the research, the key findings obtained, and the recommendations or implications of the study. This data is organized in Table 2 of the data extraction to facilitate the synthesis of the findings.

Table 2. Data Extraction

Author (Year)	Design	Population & Exposure	Key Outcomes	Main Findings / Direction
Saadia (2018)	Quantitative randomized controlled trial	Clinical trial with 69 pregnant women (22 obese, 47 non-obese). FHR measured using cardiotocography (CTG) after 10 minutes of mobile phone exposure. Statistical analysis: independent-samples t-tests (SPSS v23)	Fetuses of obese women had higher baseline FHR and lower variability. Mobile phone use slightly affected FHR variability	Maternal obesity significantly impacts fetal FHR patterns. Proper management of obesity is crucial during the childbearing period
Bektas et al (2020)	Quantitative nonrandomized	Experimental study with 149 pregnant women divided into four groups (Control, Mobile, Wi-Fi, Mobile+Wi-Fi). Biomarkers measured: PCO, MDA, TOS, TAS, 8-OHdG, DNA breaks. Analysis: ELISA and Comet assay	Mobile phone exposure increased oxidative stress markers (8-OHdG, MDA, PCO, TOS) and DNA damage, while Wi-Fi exposure did not show significant effects	Mobile phone exposure during pregnancy may induce oxidative stress and DNA damage. Combined Wi-Fi and mobile exposure showed a synergistic harmful effect
Choi et al (2017)	Quantitative nonrandomized	Prospective cohort study (MOCEH) with 1,198 mother-child pairs. Mobile phone use recorded via questionnaires; RFR exposure measured using personal exposure meters (PEM). Neurodevelopment assessed using BSID-II (6, 12, 24, 36 months). Logistic regression for trend analysis	No significant association between RFR exposure and child neurodevelopment. However, high maternal BLL combined with high mobile use increased risk of lower PDI and MDI scores	Prenatal RFR alone did not affect neurodevelopment, but the combination with high lead exposure had a detrimental effect

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Author (Year)	Design	Population & Exposure	Key Outcomes	Main Findings / Direction
Bektas et al (2018)	Quantitative nonrandomized	Experimental study with 149 pregnant women divided into four groups based on daily phone use (0 min, 2–15 min, 15–60 min, >60 min). Cord blood analyzed for biochemical markers (AST, ALT, LDH, CK-MB, CRP, TnT, uric acid, lactate, MPV). Statistical analysis: ANOVA and Kruskal–Wallis tests	Mothers using mobile phones >60 min/day had significantly elevated AST, ALT, LDH, CK-MB, CRP, TnT, uric acid, and reduced MPV	Prolonged mobile phone use during pregnancy may alter cord blood biochemical parameters, suggesting potential risks for the fetus
Zhan et al (2024)	Quantitative nonrandomized	Retrospective case-control study with 228 pregnant women (114 CHD cases, 114 controls). Data collected from hospital records and surveys. Logistic regression analysis was used to identify risk factors	Prenatal folic acid supplementation reduced CHD risk (OR=0.342). Risk factors included maternal age >35, smoking exposure, cold medications, fever, and prolonged electronic device use	Folic acid supplementation effectively reduces CHD risk. Avoidance of identified risk factors during the perinatal period is crucial for CHD prevention
Kömürcü Karuserci et al (2019)	Quantitative nonrandomized	Questionnaire-based retrospective study with 400 women (randomly selected). Statistical analysis using t-tests and Mann-Whitney U test (SPSS v22)	Significant negative correlation between EMF exposure and newborn's birth weight, length, and head circumference. Multiple phone usage had the strongest effect	EMF exposure from phones, TVs, and base stations during pregnancy may adversely affect newborn anthropometric outcomes
Plakas et al (2022)	Quantitative nonrandomized	Case-control study with 97 children (35 with craniosynostosis, 62 controls). Data collection through 143-question interviews. Logistic regression analysis (SPSS v19)	Maternal oral medication (aOR 6.1) and oral progesterone use (aOR 4.0) were significantly associated with craniosynostosis risk	Maternal medication, especially oral progesterone, significantly increases the risk of craniosynostosis in infants

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Author (Year)	Design	Population & Exposure	Key Outcomes	Main Findings / Direction
Bektas et al (2022)	Quantitative nonrandomized	Cohort study with 123 infants (4 groups based on mothers' phone usage: 0, 20, 40, >120 min/day). General Movement Assessment (Prechtl method). Statistical analysis with Kruskal–Wallis and Mann–Whitney U tests (SPSS v22)	Infants in the >120 min/day group had significantly worse motor scores (AF, F–, suboptimal MOS) than those in lower usage groups	Longer mobile phone usage during pregnancy may impair infants' motor development, highlighting the need for usage limitations
Bektas et al (2021)	Quantitative nonrandomized	Experimental study with 149 pregnant women (4 groups based on usage duration). Analysis of oxidative stress markers (8-OHdG, MDA, PCO) and DNA damage (comet assay). Statistical analysis using ANOVA and Kruskal–Wallis tests	Higher mobile phone usage was correlated with increased oxidative stress markers and DNA damage in cord blood and placenta	Prolonged exposure to mobile phone radiation during pregnancy may increase oxidative stress and DNA damage in fetuses
Zarei et al (2019)	Quantitative nonrandomized	Cross-sectional study with 110 children with speech problems and 75 healthy controls. Data collected via interviews using a semi-structured questionnaire. Analysis with Chi-square test (SPSS v19)	Cordless phone use before (P=0.005) and during pregnancy (P=0.014) and proximity to power lines (before P=0.003; during P=0.002) were significantly associated with speech problems. No significant link for mobile phones or ionizing radiation.	Maternal exposure to certain EMF sources (cordless phones, power lines) during pregnancy may increase offspring's risk of speech problems
Tang et al (2024)	Quantitative nonrandomized	Retrospective cohort study with 732 women from three hospitals. Data collected via interviews and antenatal records. Analysis with GEE and logistic regression	Television exposure before sleep increased HDP risk by 81.5% (OR=1.815, P=0.018). Longer daily TV exposure in the third trimester tripled HDP severity (OR=3.641, P=0.021)	Prolonged TV exposure during pregnancy, particularly before sleep and in the third trimester, may increase HDP risk and severity

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Author (Year)	Design	Population & Exposure	Key Outcomes	Main Findings / Direction
Yang et al (2024)	Quantitative nonrandomized	Cross-sectional study with 665 women in early pregnancy. Depression assessed using PHQ-9 scale. Statistical analysis: logistic regression and ROC curve analysis	Smartphone use >5 hours/day (OR=1.09, P=0.015), smartphone use before sleep (OR=1.24, P=0.016), and TV use before sleep (OR=1.35, P=0.006) were significantly associated with depression risk	Prolonged screen exposure, especially smartphone use before sleep, increases depression risk in early pregnancy
Chen et al (2020)	Quantitative nonrandomized	Cross-sectional study with 6236 mother-child pairs from the Shanghai Children Allergy Study (SCAS). Respiratory allergies assessed via ISAAC questionnaire. Analysis with logistic regression models	Maternal short sleep, low physical activity, and screen time ≥2 hours/day increased childhood allergy risk, especially in boys. Combined exposures showed a dose-response effect (OR=2.412 for all three factors)	Maternal sleep, activity, and screen habits during pregnancy significantly influence childhood allergy risk, especially in boys
Çöl et al (2021)	Quantitative nonrandomized	Cross-sectional study with 400 children aged 1 month to 5 years. Data collected via parent questionnaires. Analysis with chi-square, Mann-Whitney U, and logistic regression	Maternal use of EMDs (e.g., mobile phones, Wi-Fi) during pregnancy increased children's sleep disturbances ($p<0.05$). Presence of EMDs in the sleeping environment also correlated with shorter sleep duration and more frequent night waking	Maternal EMD use during pregnancy and the presence of devices in children's bedrooms are associated with sleep disturbances in early childhood
Emre et al (2021)	Quantitative descriptive	Experimental in vitro study with amniocytes from 48 pregnant women. Samples exposed to RF-EMR (900 MHz) and nicotine. Apoptosis measured using flow cytometry	Both RF-EMR and nicotine significantly increased apoptosis and necrosis rates. Combined exposure had a synergistic effect with higher apoptotic rates ($p<0.001$)	Exposure to 900 MHz RF-EMR and nicotine during pregnancy may significantly increase fetal cell apoptosis, with stronger effects when combined

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Author (Year)	Design	Population & Exposure	Key Outcomes	Main Findings / Direction
Boileau et al (2020)	Quantitative nonrandomized	Prospective cohort study (NéHaVi cohort) with 1,378 mothers and their newborns.	Mothers using mobile phones more than 30 minutes/day were more likely to have infants with growth restriction.	Excessive mobile phone use during pregnancy may negatively impact fetal growth, requiring further prospective studies.
Lu et al (2017)	Quantitative nonrandomized	Survey with 461 mother-child pairs from Kumamoto, Japan, with questionnaires on mobile phone usage.	Excessive mobile phone use during pregnancy was associated with lower birth weight and higher rates of infant emergency transport.	Excessive mobile phone use during pregnancy may be a risk factor for lower birth weight and infant health complications.
Sudan et al (2018a)	Quantitative nonrandomized	Meta-analysis of three cohorts: Danish National Birth Cohort (DNBC), Spanish Environment and Childhood Project (INMA), and Korean Mothers and Children's Environmental Health Study (MOCEH).	No clear associations were found between maternal cell phone use and children's cognition scores. A slight pattern of lower scores was observed in children with higher maternal cell phone use.	Further scrutiny is required as results showed some trends but no definitive findings.
Papadopoulou et al. (2017)	Quantitative nonrandomized	Prospective cohort study of 45,389 mother-child pairs from the MoBa study, using questionnaires to assess mobile phone use and child development.	Children of mobile phone users had lower risks of low sentence complexity and motor skills at age 3, with a dose-response relationship for mobile phone use.	No evidence of adverse neurodevelopmental effects of prenatal mobile phone use, with potential benefits in language and motor skills at age 3.

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This literature review includes 19 studies that have undergone the selection process based on inclusion and exclusion criteria, and quality assessment. The studies analyzed come from various academic journals that discuss the impact of gadget use in pregnancy. The distribution of research methodologies shows that all of the studies were quantitative designs with the majority of the studies using quantitative nonrandomized (n = 17, 89,5%), and the rest were quantitative randomized controlled trials (n = 1, 5,3%), and quantitative descriptive (n = 1, 5,3%).

Synthesis of Evidence

Nineteen studies published between 2017 and 2024 were included in this review, encompassing cross-sectional, cohort, case-control, and experimental designs. Most studies were quantitative and conducted in middle- to high-income countries, with sample sizes ranging from 69 to over 45,000 participants. Exposure measures varied considerably, including self-reported screen time (e.g., smartphone or television use) and estimated electromagnetic field (EMF) or radiofrequency radiation (RFR) exposure. Based on the MMAT appraisal, the overall methodological quality was moderate to high (scores 3–5/5), although limitations were noted in exposure measurement consistency and reliance on self-reported data. Overall, the findings suggest that excessive gadget use and prolonged EMF exposure during pregnancy are associated with a spectrum of psychological, physical, and fetal–child outcomes, though the strength and direction of these associations differ by study design and exposure type.

1. Psychological Impact of Gadget Use During Pregnancy

Evidence on the psychological effects of gadget use during pregnancy remains limited, with only one study meeting inclusion criteria (Yang et al., 2024). This cross-sectional study identified a significant association between prolonged smartphone or television use before sleep and increased depression risk among pregnant women. The effect was strongest for daily smartphone use exceeding 7.5 hours and screen exposure more than 1.5 hours before bedtime, indicating that behavioral screen use—rather than EMF exposure per se—may play a larger role in influencing maternal mood. The findings align with broader evidence that pregnancy heightens vulnerability to stress-related mental health disorders (Biaggi et al., 2016; Robinson et al., 2019). Disrupted sleep and sedentary behavior appear to mediate this relationship, underscoring the need for antenatal counseling on digital hygiene and mental well-being.

2. Physical Health Impacts

Among the reviewed studies, Tang et al (2024) was the only one directly assessing maternal physical health outcomes related to gadget use. Their retrospective cohort study found that television viewing before sleep significantly increased the risk of hypertensive disorders of pregnancy (HDP), especially in the third trimester. This pattern suggests that the timing and duration of screen exposure—particularly exposure to blue light and sedentary habits before sleep—may contribute to cardiovascular stress during pregnancy.

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Complementary findings from other sources highlight related health effects, such as eye strain, musculoskeletal discomfort, and sleep disturbances from prolonged screen use (Tristanti et al., 2020). These symptoms, though secondary, can compound pregnancy-related physical strain. Notably, none of the reviewed studies provided robust physiological measurements of radiation exposure, indicating a need for standardized exposure metrics and objective monitoring tools in future research.

3. Fetal, Newborn, and Child Impacts

The majority of studies (13 of 19) examined the effects of maternal gadget use or electromagnetic field (EMF) exposure on fetal and child outcomes, with findings largely influenced by the type of exposure and the measurement methods employed. Studies focusing on EMF exposure, such as those by Bektas et al (2020), Kömürcü Karuserci et al (2019), and Lu et al (2017), consistently reported associations between prenatal EMF exposure and adverse fetal growth indicators, including reduced birth weight, shorter body length, and smaller head circumference. Mechanistically, these studies suggest that oxidative stress and DNA damage may mediate the observed outcomes, indicating a biological pathway through which EMF exposure could interfere with fetal development.

In contrast, studies assessing behavioral aspects of gadget use—particularly those measuring screen time—tended to focus on developmental and neurobehavioral outcomes in children. Research by Choi et al (2017), Bektas et al (2022), Zarei et al (2019), and Çöl et al (2021) reported associations between prolonged maternal screen use and increased risks of delayed motor development, speech problems, behavioral disturbances, and sleep disruption among children. However, evidence from large-scale cohort studies, including those conducted by Papadopoulou et al (2017) and Sudan et al (2018), did not support significant adverse neurodevelopmental effects of prenatal mobile phone use, suggesting that low-to-moderate exposure levels may not pose substantial harm when confounding factors such as socioeconomic status and environmental co-exposures are taken into account.

Overall, inconsistencies in findings across studies likely reflect variations in exposure assessment—specifically, differences between quantifying EMF intensity and measuring screen time duration—as well as the use of diverse outcome assessment tools. Studies with higher MMAT quality scores generally demonstrated more rigorous designs, often employing objective biomarkers or standardized developmental scales, which yielded more reliable and interpretable results.

The collective evidence indicates that reducing screen exposure before sleep, maintaining balanced daily activity, and educating pregnant women on digital hygiene can mitigate psychological and physical risks. Antenatal programs should integrate guidance on screen-time management, posture, and sleep hygiene as part of holistic maternal care.

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Future research should prioritize longitudinal cohort studies with standardized measures of EMF intensity and screen duration, explore dose–response relationships, and incorporate objective exposure monitoring (e.g., wearable sensors). Integrating biological, behavioral, and environmental indicators will help clarify causal pathways and guide evidence-based recommendations for safe gadget use during pregnancy.

CONCLUSION

Excessive gadget use during pregnancy may be associated with both maternal and fetal health. Prolonged screen time, particularly before sleep, has been linked to heightened symptoms of anxiety and depression among pregnant women, while television viewing during late pregnancy has been associated with an increased risk of hypertensive disorders such as preeclampsia. Furthermore, exposure to electromagnetic fields (EMFs) from electronic devices has been correlated with impaired fetal growth, including lower birth weight and shorter gestational duration, and prolonged mobile phone use has been linked to developmental issues in children, such as speech delays and cognitive difficulties. Although some studies reported no significant neurodevelopmental effects, these inconsistencies highlight the need for cautious interpretation.

Future research should prioritize longitudinal and experimental studies employing standardized exposure and outcome measures to better establish causal relationships and clarify safe thresholds of digital exposure during pregnancy. The findings also underscore the importance of incorporating antenatal education and public health initiatives that promote balanced digital use, encourage limiting screen time—especially before sleep—and raise awareness about potential health implications. Such evidence-based guidance can support healthier digital habits among expectant mothers and contribute to improved maternal and child well-being.

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