

Association Between Social Media Screen Time and Depression and Anxiety Among Adolescents: A Systematic Review

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Abstract

Social media use by youth is nearly a universal phenomenon. Adolescents of this generation find it very challenging to envision a life without social media. Despite its pervasive use among children and adolescents, there has been very little research conducted to understand the impact of time spent on social media on children, especially on their mental health and wellbeing. This systematic review examines the extent to which social media screen time is associated between depressive and anxiety symptoms among adolescents aged 10-19 years. Following the PRISMA 2020 Statement, six databases and Google Scholar were searched, of which fifty eligibility studies were retrieved which was published between January 2015 and August 2026, comprising 33 cross-sectional and 17 cohort designs. Two independent reviewers partitioned records, extracted data, and assessed methodological quality using the Joanna Briggs Institute (JBI) Critical Appraisal Checklists for cross-sectional and cohort studies. As a result of the substantial heterogeneity in exposure and outcome measures, a narrative synthesis of the findings was more relevant than statistical pooling. The majority of studies reported a significant positive association between social media use and depressive symptoms, with the recent cohort studies using within-person analytic techniques strengthening this association. Evidence for anxiety was directionally similar but weaker, less consistent, and in several studies non-linear. The key moderating and mediating factors were gender, sleep disruptions, cyberbullying, active vs. passive engagement, and familial and peer environments. Quality appraisal indicated a generally sound evidence base, with all cross-sectional studies rated high quality, confidence was limited by widespread dependence on unvalidated self-report exposure measures and unclear baseline symptom status in the cohort studies. These findings support a shift in clinical practice, policy, and future research away from screen-time limits alone and toward assessing the pattern, content, and context of adolescent social media use.

Keywords: adolescents; social media screen time; depression; anxiety; mental health

1 Introduction

Adolescence represents a critical period of an individual's physical, cognitive, emotional, and social development during which individuals begin developing behavioral patterns which influences health and wellbeing in the long run. The widespread presence and adoption of digital technologies in their social environment have been a transformative living experience in adolescents' everyday lives, with social media being one of the most integral features of an individual's existence. The emergence of platforms such as Instagram, WhatsApp, Snapchat, Facebook, and TikTok has become an indispensable part to communication, entertainment, identity formation, and peer interaction. While these platforms provide a medium and opportunity for digital connectedness, learning, creativity, and self-expression, concerns also have emerged with regards to their potential association with mental health problems, particularly depression and anxiety [1], [2]. Over the past decade, smartphone ownership and internet accessibility

have expanded rapidly, resultant in unprecedented levels of social media engagement among adolescents. The COVID-19 pandemic exacerbated the digital dependency as educational activities, communicating with peers, and recreational participation gradually shifted to online platforms. Subsequently, adolescents now spend several hours each day interacting through social media, making digital engagement an integral part of their developmental setting. This rapid transformation has prompted researchers to investigate if the use of social media over time contributes to psychological distress or merely reflects the pre-existing emotional difficulties among vulnerable adolescents [2], [3], [4]. Depression and anxiety are among the leading causes of illness and disability during adolescence [5]. These conditions have an adverse effect on academic performance, interpersonal relationships, emotional regulation, self-esteem, and overall quality of life. Persistent symptoms may continue to affect individuals throughout adulthood, increasing the risk of problematic substance use, unemployment, self-harm, and suicide [6]. Given the global rise in prevalence of adolescent mental health disorders, recognizing modifiable behavioral factors is a noteworthy public health priority. Social media use has emerged as one such behavioral determinant because of its universal reach, accessibility, and plausible influence on adolescents' cognitive, emotional, and social functioning [7], [8].

The objective of this systematic review is to synthesize current empirical evidence regarding the association between social media screen time and symptoms of depression and anxiety among adolescents. Through a comprehensive review of selectively reviewed literature, the study sets out to specify the nature of this relationship, identify consistent trends across diverse populations, and provide recommendations for future research, educational practice, positive mental health promotion, and digital wellbeing campaigns and policies.

1.1 Research Gap

Previous systematic reviews often failed to distinguish general screen time with social media use, limiting the ability to detach the independent contribution of social networking platforms. Several reviews have also covered broad age groups encompassing childhood, adolescence, and adulthood, or inspected multiple mental health outcomes simultaneously rather than overtly focusing on depression and anxiety. Given the rapidly evolving nature of social media and the publication of numerous high-quality studies after 2020, an updated review is essential focusing specifically on adolescent social media screen time and its association with depression and anxiety. This systematic review therefore synthesizes evidence from fifty empirical studies published between January 2015 and August 2026, examining association between social media screen time and depression and anxiety among adolescents aged 10 to 19 years. It incorporated findings from longitudinal cohort, cross-sectional, and other observational study designs to identify areas of agreement, inconsistency, methodological strength, and remaining research gaps to support evidence-informed decision-making for researchers, clinicians, educators, parents, and policymakers.

1.2 Research Questions

The review was guided by four questions, structured using the Population, Exposure, Outcome (PEO) framework.

- 1) What is the association between social media screen time and depression among adolescents aged 10 to 19 years?
- 2) What is the association between social media screen time and anxiety among adolescents aged 10 to 19 years?

- 3) Which demographic, behavioural, and contextual factors influence this relationship?
- 4) What methodological strengths, limitations, and gaps exist in the current evidence?

2 Literature Review

The relationship between social media use and adolescent mental health has gained prominence as one of the most widely researched topics in contemporary public health and educational research. The meteoric rise and adoption of smartphones and social networking platforms during the past decade have been a transformative experience in adolescent lifestyles, communication patterns, and social relationships. While social media provides opportunities for learning, entertainment, identity exploration, and peer interaction, there is mounting concern regarding its potential influence on depression and anxiety. The fifty studies included in this systematic review provide a comprehensive understanding of this evolving field by examining diverse populations, study designs, and methodological approaches. Collectively, these studies make it clear that despite the beneficial and detrimental effects of social media, excessive or problematic levels of use is consistently associated with poorer mental health outcomes amongst adolescents.

2.1 Global Trends in Social Media use among adolescents

The reviewed studies have consistently established that social media use is now near-universal amongst adolescents across developed and developing countries. Investigations conducted in Canada, United States, United Kingdom, Australia, Finland, China, South Africa, Iran, and several European countries have revealed that adolescents spend increasing amounts of time on social networking platforms for communication, entertainment, information seeking, and academic work [9], [10], [11], [12]. Recent cohort studies further reveal that the COVID-19 pandemic has substantially increased social media engagement as a consequence of online schooling, social isolation, and reduced face to face interaction [2], [13]. These findings are suggestive of the fact that social media has become embedded within adolescent development, making its impact on mental health a critical public health concern.

2.2 Evidence linking Social Media use with Depression

The majority of the included studies reported a significant positive association between increased social media use and depressive symptoms. Early investigations have established that adolescents reporting prolonged social networking activity experienced significantly higher levels of depression and psychological distress [9], [14], [15]. These findings were reinforced by subsequent evidence implying that excessive online engagement contributed to lower life satisfaction, reduced self-esteem, and increased emotional problems, notably among girls [16], [17], [18].

Longitudinal evidence provides stronger support for these associations. Increased social media use has been shown to predict later depressive symptoms after controlling for baseline mental health and other forms of screen time [1]. Similarly, distinct trajectories of social media interaction have been identified, with adolescents showing typically high use experiencing greater depressive symptoms than those with moderate or declining use [2]. Converging evidences from longitudinal findings indicate that sustained exposure may contribute to a cumulative deterioration of emotional wellbeing [7], [8], [13], [19], [20], [21].

Numerous studies have identified mediating pathways through which depression may develop, in which Sleep disruption, cyberbullying, social comparison, fear of missing out, body image dissatisfaction, and reduced face to face interaction emerged as important mechanisms linking social media use with depressive symptoms [22], [23], [24]. Overall, these findings are consistent with the view that depression is influenced

not merely by the duration of social media use but also by the quality and context of adolescents' online experience.

2.3 Evidence Linking Social Media Use with Anxiety

Anxiety is another key outcome of interest within the reviewed literature. Numerous studies have reported that adolescents who engaged in prolonged or problematic social media use exhibited higher levels of anxiety symptoms than those with moderate or limited use, with consistent positive associations documented between intensive social media engagement and anxiety, [9], [14], [11], [12]. Recent evidences have strengthened this evidence base, which reported an increase in anxiety levels over time among adults with persistently high levels of social media use [2], [10], [13], [15], [21], [25]. Evidence also suggests a non-linear pattern, with moderate use linked to significantly lower anxiety levels than both minimal and excessive use [2]. These studies suggest that continuous exposure to peer evaluation, social comparison, online conflict, and constant connectivity may increase emotional stress and psychological vulnerability. Anxiety was also found to be closely related to compulsive checking behavior, problematic smartphone dependence, and disrupted sleep patterns [22], [23].

Cross-sectional investigations have likewise reported to have higher levels of emotional distress among adolescents with greater social media engagement [10], [22], [23], [24], [25] with problematic instead of moderate use associated with poorer psychological wellbeing [11]. These findings, when taken together, suggest that patterns of engagement, including compulsive use and emotional dependence, may be comparatively more important determinants of mental health than its duration itself. Positive Associations were also reported in most studies, but their effect sizes were consistently small. This pattern reveals about anxiety being shaped by several interacting factors, with social media use as one contributor among them. These findings reinforce the significance of taking into account individual characteristics and contextual variables when accounting for the observed relationships

2.4 Longitudinal and Cross-Sectional Evidence

The included studies cover both longitudinal cohort investigations and cross-sectional surveys, and provide complementary evidence regarding the association between social media use and mental health. Cross sectional studies contributed valuable information on the prevalence and correlational relationships across diverse populations, with several investigations consistently indicating higher depression and anxiety scores among adolescents reporting greater social media engagement [10], [11], [12], [22], [23], [24], [25], [26].

Longitudinal studies also strengthened these findings by establishing temporal associations between exposure and mental health outcomes, with increased social media use shown to precede deteriorating mental health outcomes over time [1], [2], [7], [8], [13], [19], [20], [21]. Similar findings have also been documented across various geographical regions, suggesting that this phenomenon extends beyond specific cultural contexts. Nevertheless, these studies also acknowledged the possibility of a bidirectional relationship: adolescents with existing depression or anxiety may subsequently increase their social media use as a coping strategy. This reciprocal relationship remains an important area for future investigation.

Despite the growing body of evidence, substantial inconsistencies remain within the literature. While numerous studies report harmful associations, others argue that their relationship is limited or influenced by mediating variables such as sleep quality, gender, parental monitoring, peer support, and socioeconomic status. A few investigations have even reported useful effects of moderate social media use, particularly when it is used by adolescents to actively engage in supportive online communities or maintain meaningful social relationships through these digital platforms [27], [28]. These discrepancies have been fueling

sustained debates over whether social media itself contributes to declining mental health or whether pre-existing vulnerabilities in adolescents drive the individual to be more likely to engage extensively in social media.

Methodological differences compound to the conflicting findings. Studies have measured exposure using hours of daily use, frequency of platform access, active versus passive engagement, problematic use scales, and trajectory-based classifications. Depression and anxiety have been assessed with equivalent measures using a range of validated instruments, including self-report questionnaires and parent reported measures. Direct comparison is challenging across studies due to the heterogeneity in study design, sample characteristics, follow up duration, and statistical approach. These methodological inconsistencies highlight the importance of systematically integrating the available evidence to identify recurring patterns and determine the strength of existing associations [1], [2].

2.5 Moderating and Mediating Factors

The reviewed studies indicate that the relationship between social media use and adolescent mental health is not uniform across populations [29]. Several studies have recognized gender differences, with female adolescents generally reported to have stronger associations between social media use and depressive symptoms than males [16], [17]. Sleep quality has additionally emerged as one of the most frequently reported mediators, with excessive nighttime social media use contributing to shorter sleep duration and poorer psychological outcomes [14], [22]. Cyberbullying, body image concerns, fear of missing out, problematic smartphone use, parental monitoring, family support, peer relationships, socioeconomic status, and resilience were also identified as significant moderating variables [23], [27], [28], [29]. Greater resilience was seen among adolescents with supportive family environments and healthy offline relationships, despite the frequency of their social media use. These findings point to an underlying pattern: exposure is solely not responsible for the psychological outcomes. They are rather shaped by the interaction of pre-existing vulnerabilities, contextual influences and digital practices.

Researchers have proposed several mechanisms through which social media may influence adolescent mental health, which comprises of reduced sleep duration, increased sedentary behavior, exposure to cyberbullying, unhealthy social comparison, and fear of missing out, alongside reduced self-esteem from continuous exposure to idealized online images and lifestyles [27], [28]. Excessive use may lead to reduced sleep duration, increased sedentary behavior, exposes adolescents to cyberbullying, encourages unhealthy social comparison, and creates a fear of missing out. Prolonged exposure to idealized representations of online images and lifestyle may reduce self-esteem and increase depressive symptoms. Conversely, social media may also provide emotional support, strengthen friendships, facilitate access to health information, and foster a sense of belonging among socially isolated adolescents, revealing that the relationship is shaped by the quality, context, and purpose of digital engagement rather than by time spent online alone. Recent investigations have expanded the scope of this research by examining potential mediator and moderator mechanisms such as sleep disruption, cyberbullying, emotional regulation, problematic use, gender, developmental stage, resilience [13], [21], [22], [28], [30].

2.6 Positive Effects of Social Media

Although much of the literature focuses on potential harm, a significant number of studies have highlighted the favorable aspects of social media. Unlike heavy or passive use, moderate and purposeful engagement fostered peer support, emotional expression, educational collaboration, access to health information, and maintenance of friendships, outcomes that proved particularly critical during periods of social isolation [27],

[28]. Some studies suggested that active participation, rather than passive browsing, may promote greater social connectedness and emotional wellbeing, with moderate social media engagement associated with comparatively lower anxiety than both minimal and excessive use, suggesting a non-linear relationship [2]. These findings validate that social media use should not be treated as inherently harmful. Instead, psychological outcomes tend to be shaped by engagement styles, individual susceptibility, and the broader social context of digital interaction [31].

3 Methodology

This chapter presents the methodology used to conduct the systematic review on the association between social media screen time and depression and anxiety among adolescents. The review follows the PRISMA 2020 Statement [32] for reporting and the Joanna Briggs Institute (JBI) Critical Appraisal Checklists [33] for quality assessment. These frameworks guided and shaped the review from the original research plan through to the final synthesis of evidence, so as to ensure a transparent and reproducible process. The review was guided by the four research questions presented in the preceding section.

3.1 Research Design

This study used a systematic review design to identify, appraise, and synthesize observational evidence through explicit, reproducible methods. Screening of the literature confirmed that every one of the fifty included studies used either a cross sectional or a cohort design, so the review is structured around these two designs only. Studies were published between 2015 and 2026, the period during which social media became a dominant part of adolescent digital life.

3.2 Eligibility Criteria

Studies were included if they involved adolescents aged 10 to 19 years, measured social media screen time as the exposure, assessed depression and/or anxiety with a validated tool, used a cross-sectional or cohort design, and were published in English in peer-reviewed journals between January 2015 and August 2026.

Studies were excluded if they combined social media with general screen time, addressed only internet addiction or gaming disorder, sampled adults or children under 10 and above 19 without providing separate adolescent data, or were reviews, protocols, conference abstracts, or qualitative studies. These criteria were pre-determined prior to the search and applied consistently at each stage of the screening to ensure the review process remains transparent and reproducible.

3.3 Databases Used and Search Strategy

The following six databases were searched: PubMed/MEDLINE, Scopus, Web of Science, PsycINFO, CINAHL, and the Cochrane Library. In addition to these searches, reference lists were manually screened and the first 200 records extracted from Google Scholar were screened. Searches were conducted using combinations of the following keywords and Boolean operators: (Adolescent OR teen OR youth) AND (social media OR screen time OR Instagram OR TikTok) AND (depression OR anxiety OR mental health); tailored to each database's syntax and limited to English language publications between January 2015 and August 2026.

3.4 Study Selection Process

Selection followed the PRISMA 2020 workflow. Table 1 summarizes the five stages that reduced the initial search results to the fifty studies included in the review.

Table 1. Summary of the five stage initial search results.

Stage	Action Taken	Records Remaining
Identification	Records retrieved from all databases and Google Scholar	~2,500
Duplicate removal	Duplicate records removed using reference management software	~2,100
Title and abstract screening	Records screened against the eligibility criteria by two independent reviewers	~180
Full text assessment	Full articles retrieved and assessed for eligibility, disagreements resolved by discussion with a reviewer	~70
Final inclusion	Studies meeting all eligibility criteria retained for the review	50

3.5 Data Extraction

A standardized form was used to extract details from each study about the author and year, country, sample size and age range, study design, how social media exposure was measured, the depression and/or anxiety tool used, effect estimates, confounders adjusted for, key findings, and funding source. Extracted data were compiled into summary tables to support comparison and synthesis across studies.

3.6 Quality Assessment

Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklists. Because the fifty included studies were either cross sectional or cohort in design, only the two corresponding checklists were applied, as shown in Table 2.

Table 2. Summary of the JBI Checklist.

Study Design	JBI Checklist Applied	Studies Assessed
Cross sectional	JBI Checklist for Analytical Cross-Sectional Studies	33
Cohort	JBI Checklist for Cohort Studies	17

Each criterion was rated Yes, no, Unclear, or Not Applicable, which covered participant selection, exposure measurement, outcome assessment, confounding factors, and appropriateness of statistical analysis, with follow up completeness also rated for cohort studies. Studies were classified as high, moderate, or low quality on their overall score. No study was excluded on quality grounds; instead, appraisal results informed the weight assigned to each study's findings during synthesis.

3.7 Data Synthesis

The characteristics of the study were catalogued based on year, country, design, sample and measures used. The obtained findings were grouped into four themes, aligning with the research gaps: association with depression, association with anxiety, mediating and moderating variables and methodological gaps. A meta-analysis was considered for studies which shared comparable exposure measures, outcome tools and effect

sizes, but given the varied approaches of measurement across the extracted studies, the findings were synthesized narratively, with effect directions and magnitudes compared systematically across studies

3.8 Ethical Considerations

This review study only used secondary data extracted from already published peer-reviewed research, so there was no requirement to obtain any institutional ethical approval. The included studies were accurately cited in line with the APA 7th edition guidelines, and findings were objectively reported with no fabrication or selective interpretation.

3.9 Rigor and Trustworthiness

Rigor was supported through a predefined eligibility criterion, a comprehensive multi-database search, independent screening by two reviewers, and design-specific JBI quality appraisal. The PRISMA 2020 statement was followed to ensure transparent, reproducible reporting throughout the review process.

4 Results

4.1 Characteristics of the Included Studies

The fifty included studies were published between January 2015 and August 2026, with a substantial number of studies published from 2019 onwards. Thirty-three studies used a cross-sectional design and seventeen used a cohort design. These studies were conducted predominantly in high-income countries: thirteen were based out the United States, and others originated from the United Kingdom, Canada, and Scandinavian countries (Sweden and Norway). One study employed the Health Behavior in School-aged Children (HBSC) dataset covering twenty-nine countries. Representation from the middle-income countries were limited to single studies from Turkey and China, and no published studies from Africa, South America, or South Asia fulfilled the inclusion criteria, indicating a concentration of evidence in high-income, Western contexts.

Sample sizes ranged from 178 participants [34] to 154,981 participants [11], with various studies employing large national or multinational surveys and cohort studies (e.g., the Millennium Cohort Study, the ABCD Study, Understanding Society, and Ungdata). Most samples fell within the review's target age range of 10 to 19 years; a minority of the cohort studies had a baseline age of 9 to 10 years with follow-up extending to 20 or 21 years, reflecting the practical challenges of precisely aligning existing longitudinal datasets to the adolescent age band. Gender distribution was balanced across most samples (approximately 45 to 55 percent female), with one study confining sampling to girls [19].

Social media exposure was assessed exclusively through self-report measures, predominantly using single-item measures of daily or weekly hours of use; though several studies used validated problematic-use scales such as the Bergen Social Media Addiction Scale, Social Media Disorder Scale, and the Social Media Use Integration Scale. Only one study [27] supplemented self-report with device-recorded screen-time data. Depressive and anxiety symptoms were assessed using more than fifteen different validated instruments across the fifty studies, including the Patient Health Questionnaire (PHQ-9), the Generalized Anxiety Disorder scale (GAD-7), the Centre for Epidemiologic Studies Depression Scale (CES-D), the Hospital Anxiety and Depression Scale, the Child Behavior Checklist (CBCL), the Revised Child Anxiety and Depression Scale (RCADS), the Strengths and Difficulties Questionnaire (SDQ), the Brief Symptom Inventory, the Short Mood and Feelings Questionnaire, and the DASS-21, among others. This instrument diversity, summarized in Table 3, is the principal reason a narrative rather than meta-analytic synthesis was adopted.

Table 3. Summary characteristics of the fifty included studies

Characteristic	Summary
Publication years	2015–2026 (majority published 2019 or later)
Study design	Cross-sectional, n = 33; Cohort, n = 17
Geographic spread	Predominantly North America, UK/Ireland, and Scandinavia; one 29-country dataset (HBSC); limited representation from Asia (Hong Kong, China) and the Middle East/Turkey; none from Africa or South America
Sample size range	N = 178 to N = 154,981
Age range	Predominantly 10–19 years; a minority of cohort baselines/follow-ups extended to 9–10 or 20–21 years
Gender distribution	Broadly balanced (~45–55% female) in most studies; one all-female sample
Exposure measurement	Self-report in 49/50 studies (single-item duration measures most common; several validated problematic-use scales); one study supplemented with device-recorded data
Outcome measurement	15+ distinct validated depression/anxiety instruments used across the sample

4.2 Methodological Quality: JBI Critical Appraisal Results

Methodological quality was assessed using the JBI Checklist for Analytical Cross-Sectional Studies (33 studies) and the JBI Checklist for Cohort Studies (17 studies), as detailed in Table 4. No study was rated low quality, and none were excluded on quality grounds; appraisal results were instead used to weigh confidence in findings during synthesis. All thirty-three cross-sectional studies were rated high quality. Out of the seventeen cohort studies- ten were rated high quality, and seven were rated moderate quality. Evidently, every moderately rated study was a cohort study, indicating that the additional appraisal criteria applied to longitudinal designs, particularly those concerning baseline status and follow-up completeness, were harder for studies to satisfy than the criteria applied to cross-sectional designs.

Table 4. JBI overall quality ratings by study design

Study design	Checklist applied	n	High quality	Moderate quality	Low quality
Cross-sectional	JBI Analytical Cross-Sectional Checklist (8 items)	33	33 (100%)	0	0
Cohort	JBI Cohort Studies Checklist (11 items)	17	10 (58.8%)	7 (41.2%)	0

Study design	Checklist applied	n	High quality	Moderate quality	Low quality
Total	—	50	43 (86%)	7 (14%)	0

Item-level analysis identified two recurring weaknesses that cut across both designs. First, the validity and reliability of the social media exposure measure could not be confidently determined in most studies: this item was rated unclear in 26 of 33 (79%) cross-sectional studies and 14 of 17 (82%) cohort studies, because the great majority relied on unvalidated single-item, self-report duration measures without reporting psychometric properties. Second, for cohort studies specifically, the criterion requiring that participants be free of the outcome (depression or anxiety) at baseline was rated "No" in 15 of 17 (88%) studies, most commonly because baseline symptom scores were themselves used as covariates or predictors rather than as an inclusion filter. A related item, whether reasons for loss to follow-up were described and explored, was rated unclear in 16 of 17 (94%) cohort studies. All other appraisal items, including identification of confounders, adjustment strategies, appropriateness of statistical analysis, and validity of the outcome measure, were rated "Yes" in the substantial majority of studies across both designs, indicating that analytic and confounding-control practices were generally sound. Two cohort-specific items concerning the definition of discrete exposed and unexposed groups were rated "not applicable" (11–12 of 17 studies). This pattern reflects that most cohort studies treated social media exposure as a continuous rather than categorical variable, an approach which is methodologically appropriate but not directly measurable to a checklist item written for group-comparison designs.

When taken as a whole, the appraisal suggests that the evidence base is largely methodologically sound, mainly in regard to confounding control and statistical analysis, but one whose certainty is impeded by 2 factors: (a) heavy reliance on unvalidated self-report exposure measures across almost the entire sample, and (b) an inconsistent ability of cohort studies to establish that participants were symptom-free at baseline, which weakens confidence in the temporal and causal direction of reported associations. These two constrictions which shaped the synthesis are carried forward to the synthesis below and into the Discussion.

4.3 Synthesis of Findings by Review Questions

4.3.1 Review Question 1: Social Media Screen Time and Depression

A substantial majority of the studies, approximately four in five, have reported a statistically significant positive association between higher social media screen time or problematic use and depressive symptoms in at least one analysis. This pattern was evident across both designs and across measurement approaches. Elevated depression scores among adolescents with heavier use, beyond the threshold of roughly one to three hours per day have been found in cross-sectional studies conducted using a large national or school-based samples [9], [13], [16], [20], [35]. Results from cohort studies also strengthened this evidence, by establishing a temporal precedence: within-person increases in social media use were predictors for subsequent increases in depressive symptoms after accounting for baseline levels and stable individual characteristics [25], [36], [37], and higher screen-time trajectories from early to mid-adolescence were associated with significantly higher depression scores relative to persistently low users, with the largest trajectory group showing the greatest elevation [2]. A smaller but consistent subset of studies reported null or attenuated associations once confounders were introduced, or reported effects that reversed direction. Cross-sectional national survey data found no consistent evidence that daily social media use was a meaningful risk factor for depressive symptoms once a broad set of covariates and risk strata were applied [7], and two cohort studies found that associations present in unadjusted models became non-significant

after adjustment for demographic and family covariates [23], [30]. Two cohort studies using cross-lagged panel methods found evidence of the reverse pathway, in which baseline depressive symptoms predicted later increases in social media use rather than the reverse [8], [19], and an eight-year cohort study found a moderate between-person association but no significant within-person, prospective effect [38]. Overall, the depression evidence base was more consistent in direction and more frequently supported by temporally-ordered, within-person analyses than the anxiety evidence base discussed next.

4.3.2 Review Question 2: Social Media Screen Time and Anxiety

The evidence linking social media screen time to anxiety was directionally similar to the depression evidence but markedly less consistent. A number of studies reported significant positive associations, particularly for heavier or more compulsive use [1], [9], [35], [39], [40], [41]. However, a substantial proportion of studies reported associations that were small, non-significant after adjustment, or confined to specific subgroups or forms of use. Anxiety associations attenuated to non-significance following covariate adjustment in more than one cohort study [30], and one large cohort found only a short-term, within-year, concurrent effect on anxiety that did not persist as a lagged effect [1]. A national survey found that passive rather than active social media use was significantly related to anxiety symptoms, with the association for active use no longer significant once risk and protective factors were included [3]. One large trajectory-based cohort found a counter-intuitive pattern in which moderate social media use was associated with lower anxiety than either persistently low or high use, suggesting a non-linear, U-shaped relationship rather than a simple dose-response effect [2], a pattern echoed in a Norwegian registry-linkage cohort in which both very low and very high social media use were associated with elevated odds of psychiatric diagnosis [24]. This greater inconsistency for anxiety than for depression is consistent with the pattern already noted in the literature reviewed, and may reflect the wider range of anxiety instruments used across studies (compared with depression), the smaller effect sizes typically reported for anxiety outcomes, and the possibility that anxiety is more strongly shaped by the specific quality of online interaction (for example passive comparison versus active, purposeful engagement) than by duration of use alone.

4.3.3 Demographic, Behavioral and Contextual Factors

Several recurring moderating and mediating factors emerged across the fifty studies, indicating that the association between social media screen time and adolescent mental health is not uniform but is shaped by who is using social media, how, and in what context. Gender was the most consistently reported moderator across studies. Associations between social media use and depressive symptoms were generally stronger among girls than boys [16], [17], [20], [31], [41]. Girls appeared more susceptible to social-media-specific risks, such as public account exposure and platform-based social comparison, whereas boys' outcomes were more associated with gaming and general screen time [13].

Sleep disruption was identified as a frequently identified mediating pathway, with the night-time-specific social media use predicting poorer sleep quality, which in turn predicted higher depression and anxiety scores [14], [16], [22]. Similarly, cyberbullying and online harassment were also identified as key mediators of the relationship between frequent use and poorer wellbeing, particularly among girls [16], [17], [42].

The pattern and quality of use were consistently stronger predictors than raw duration. Passive use (browsing without interaction) was more strongly associated with detrimental symptoms than active use (posting, messaging) [3]; and problematic or compulsive use, measured through addiction-type scales was more strongly and consistently associated with distress than simple hours-per-day measures [11], [43], [44], [45]. Content and platform were also consequential: specific platforms, markedly Instagram and TikTok, were

more strongly associated with depressive symptoms than others in one study [46], and a Chinese cohort found that different categories of smartphone content carried substantially different degrees of risk [47].

Family and social context served a broad protective function. Parental monitoring and active guidance regarding social media use were associated with lower odds of anxiety and depression [10]. Negative family climate and parental distress were more powerful predictors of heavy adolescent social media use than socioeconomic status alone [48]. Strong offline peer relationships were found to be protective factors even among heavy users [22]; physical activity partially mediated, and appeared protective against, the association between social media use and depression, anxiety, and loneliness [49]. Self-esteem, body image concerns, and fear of missing out were recurrently identified as intermediate mechanisms linking use to symptoms [3], [20], [50]. Encouragingly, one school-based quasi-experimental intervention combining social-emotional learning with digital-balance strategies which produced meaningful reductions in problematic social media use and psychological distress, with its effects partially sustained at one-year follow-up [51], providing preliminary evidence that the relationship is modifiable rather than fixed.

4.3.4 Review Question 4: Methodological Strengths, Limitations, and Gaps

Consistent with the JBI appraisal findings in Table 4 above, the included evidence base displayed clear methodological strengths alongside recurring limitations. Strengths included generally appropriate identification of, and adjustment for, confounding variables; use of large, often nationally representative samples; and, in a growing number of recent cohort studies, use of within-person analytic techniques (for example, random-intercept cross-lagged panel models and multilevel growth models) that separate stable between-person differences from genuine within-person change, thus strengthening causal inference relative to earlier cross-sectional work.

Limitations were similarly consistent across studies. Nearly all the studies relied on self-reported, largely unvalidated measures of screen time which were susceptible to recall and reporting bias; only one study supplemented self-report with device-recorded data. Depression and anxiety were measured using a wide and only partially overlapping set of instruments, which, together with varying exposure categorizations, precluded meta-analytic pooling and necessitated the narrative synthesis approach adopted in this review. Most cohort studies did not establish that participants were free of the outcome at baseline, and follow-up completeness was inconsistently reported, both of which limit confidence in the direction of the associations reported. Experimental or intervention evidence remained rare, with only one quasi-experimental study identified among the fifty [51], meaning that causal claims throughout the evidence base rest almost entirely on observational designs. Finally, the geographic concentration of studies in high-income, Western contexts, represents a further gap, limiting the generalizability of findings to adolescents in low- and middle-income countries.

5 Discussion

This systematic review synthesized evidence from fifty cross-sectional and cohort studies, based on methodological quality findings from the JBI appraisal. This approach takes into account what the collective findings suggested about the nature of the relationship between adolescent social media screen time and depression & anxiety, discusses about the confidence of the evidence base in supporting the relationship, summarizes the strengths and limitations of the review, and concludes with implications for practice, policy, and future research.

5.1 The Association with Depression

The findings obtained from the studies which stated that approximately four in five studies reported a significant positive association between social media screen time and depressive symptoms, a pattern which was observed across cross-sectional and cohort designs. It is also consistent with the evidence obtained in the literature reviews and conclusions inferred from prior reviews in this field. What this review adds is that the most consistent and strongest evidence for depression explicitly came from cohort studies using within-person analytic techniques. This is important because within-person designs address a key criticism of earlier cross-sectional literature: observed associations could simply reflect stable individual differences (for example, adolescents predisposed to low mood slipping into heavier use) rather than a genuine effect of its use on their mood. Evidences from several methodologically robust cohort studies specified that within-person increases in depressive symptoms follows to a within-person increases in social media. This use strengthens, but does not conclusively establish the case for a genuine, modifiable contribution of social media exposure to depressive symptoms during adolescence [25], [36], [37]. At the same time, the minority of studies reporting null, attenuated, or reversed associations cannot be dismissed. Two cohort studies found that depressive symptoms at baseline predicted subsequent increases in social media use more strongly than social media use predicted subsequent symptoms [8], [19], a pattern consistent with a social displacement or coping-seeking explanation in which already-distressed adolescents turn to social media, rather than, or in addition to, social media generating distress. The most plausible interpretation of the combined evidence is therefore not a simple unidirectional causal claim, but rather a reciprocal or transactional relationship, whereby social media engagement and depressive symptoms reinforce one another over time, with the weight of evidence supporting a modest but genuine forward pathway from use to symptoms in addition to the reverse pathway.

5.2 The Association with Anxiety

The comparatively weaker and less consistent evidence for anxiety, relative to depression, is a notable finding of this review and warrants explanation. Three possibilities are worth considering. First, anxiety may be less sensitive to screen time as a blunt exposure measure and more sensitive to the specific content and interactional quality of use. This is supported by the finding that passive rather than active use was the more consistent anxiety correlate [3] and that anxiety associations were often explained by online harassment and social comparison rather than time itself [22]. Second, the non-linear, U-shaped pattern reported in two large cohorts, in which moderate use was associated with the lowest anxiety and both minimal and heavy use with higher anxiety [2], [24], suggests that studies modelling social media use only as a linear exposure may under-detect or dilute a real underlying association, since a linear model averages across opposing effects at the low and high ends of the exposure range. Third, anxiety outcomes were measured with an even wider array of instruments than depression, some capturing generalized anxiety, others social anxiety or physical anxiety symptoms specifically, which may have introduced additional measurement heterogeneity that obscured a true, more modest association.

This pattern of results when taken together is consistent with the interpretation that a straightforward explanation of "more time equals more anxiety" finds limited support from the broader evidence base. Guidance for adolescents, families, and educators is better framed around patterns of use, especially passive scrolling and social comparison, and around avoiding both social withdrawal from digital spaces and excessive, compulsive use, rather than around blanket time limits alone.

5.3 Moderating and Mediating Factors: Toward a Contextual Model

The consistency with which gender, sleep, cyberbullying, use pattern, platform, and family and peer context emerged across the fifty studies supports the contextual interpretation of the social-media-mental-health relationship advanced in the literature review, rather than a simple exposure-response model. Additionally, the greater vulnerability of girls evident across multiple large cohort and cross-sectional studies [16], [17], [41], together with evidence identifying sleep disruption and online harassment as principal mediating pathways among girls [16], [17], points to gender-specific risk pathways. These are plausibly linked to differing patterns of platform use, with more image- and appearance-focused platforms among girls, and to differing social consequences of victimization. This has direct implications for how interventions should be targeted, discussed below.

The evidence that problematic or compulsive use scales predicted distress more consistently than simple duration measures [11], [44], [45] supports a shift, echoed in the recommendations of several original studies themselves, away from screen-time limits as the primary policy or clinical lever and toward assessing the compulsivity, emotional dependence, and functional impact of use. The finding that a school-based intervention targeting digital-balance skills and social-emotional regulation reduced both problematic use and psychological distress, with effects partly sustained at one year [51], is an important, if isolated, piece of evidence that the relationship is amenable to change through skills-based rather than restriction-based approaches. This is reinforced by the null finding that a restrictive school phone-ban policy alone did not improve adolescent mental wellbeing, anxiety, or depression [27].

5.4 The Bidirectional Relationship

The literature review and evidences largely suggest that social media use is prospectively associated with anxiety and depression, yet a substantial minority of studies suggests the reverse pathway is also possible; a reciprocal relationship where depression and anxiety symptoms reinforce each other time, rather than a unidirectional effect. Remondi et al. [52], using a random intercept cross-lagged panel model, found that problematic social media use and emotional symptoms in adolescents formed a bidirectional feedback loop, with within-person increases in use predicting subsequent emotional symptoms and vice versa. Li et al. [53] in a large prospective cohort of Chinese adolescents, similarly reported that depressed adolescents were more likely to develop online social networking addiction, and those with addictive use were at higher risk of later depression. Xu, et al. [54] extended this by showing that inhibitory control mediated the path from internalizing problems at baseline to problematic use at follow-up, suggesting that difficulties in impulse regulation may be one mechanism through which distress translates into compulsive engagement. This is consistent with a coping-oriented account: adolescents experiencing low mood or anxiety may turn to social media for immediate relief, and where self-regulation is compromised, that coping behaviour can become self-reinforcing. Vidal et al. [55] similarly observed the bidirectional nature of the association and noted that the relationship varies according to the quantity and quality of social media use, as well as its social context.

5.5 Quality of the Evidence and Confidence in the Findings

The JBI appraisal results reported in the Results section are central to interpreting how much weight the findings above should carry. On the positive side, the near-universal identification of, and adjustment for, confounding variables, and the generally appropriate statistical analyses employed, particularly the growing use of within-person cohort models, support reasonable confidence in the associations reported by the highest-quality studies. However, two systematic weaknesses temper this confidence. First, the validity and

reliability of the social media exposure measure was unclear in the great majority of studies of both designs, meaning that measurement error, most plausibly non-differential error from imprecise self-report, may have attenuated true associations in some studies and inflated apparent inconsistency across the evidence base as a whole. Second, and more consequentially, the failure of most cohort studies to establish that participants were free of the outcome at baseline means that, for the majority of longitudinal evidence in this review, the direction of the observed association cannot be fully disentangled from reverse causation or from stable, pre-existing vulnerability. This is not a hypothetical concern: two cohort studies in this review explicitly found evidence of the reverse pathway [8], [19]. The combination of these two weaknesses means that, while the overall pattern of association reported in this review is very unlikely to be entirely spurious, given its consistency across measurement approaches, countries, and time periods, confidence in the precise magnitude and, in some cases, the direction of the relationship should remain moderate rather than high, particularly for anxiety, until measurement and baseline-control practices improve.

5.6 Comparison with Previous Reviews

The findings of this review are broadly consistent with, and extend, the literature summarized earlier. This review broadens on the prior work by categorically focusing on social media exposure among adolescents aged 10 to 19 and by incorporating a substantial number of studies published after 2020, including several using within-person cohort designs unavailable to earlier reviews. This review's identification of a non-linear, U-shaped relationship for anxiety in at least two large cohorts is a more specific finding compared to the general "complex and moderated" characterization frequently found in earlier literature, and offers a more precise, testable hypothesis for future research [2], [24]. Similarly, the finding that all thirty-three cross-sectional studies but only ten of seventeen cohort studies achieved a high JBI quality rating adds a design-specific quality dimension that is often absent from prior narrative reviews in this field.

5.7 Strengths of the Review

This review has numerous methodological strengths. The focus relied specifically on adolescents aged 10 to 19 and on social media exposure distinct from general screen time, addressing a limitation of previous reviews recognized in the research gap. A significant amount of new, methodologically stronger cohort research evidence unavailable to previous synthesis was covered in its inclusion criteria period, latest to 2026. The use of design-specific JBI critical appraisal checklists, instead of a single generic tool has allowed the quality of cross-sectional and cohort evidence to be assessed and reported separately, which in turn informed the confidence with which the findings above could be interpreted. The predefined, multi-database search strategy and independent dual screening and data extraction eliminated the risk of selection and extraction error.

5.8 Limitations of the Review

The review also has limitations which should be taken into account when evaluating its findings. The marked heterogeneity in exposure measurement and outcome instruments across the fifty studies prohibited meta-analysis. Although, this heterogeneity makes the narrative synthesis adopted narrative series approach an appropriate one, it is innately less precise than a pooled quantitative estimate and carries an element of interpretive judgement in evaluating studies of varying methodological rigor. The review was redacted to English-language, peer-reviewed publications, which may have excluded relevant evidence published in other languages or in the grey literature. As with any review of published literature, the possibility of publication bias toward statistically significant findings cannot be ruled out. The review

restricted its scope to cross-sectional and cohort designs which is consistent with the designs used in the identified literature, excluded qualitative and experimental evidence which might provide stronger causal evidence or illuminate an adolescents' subjective experience of social media use. Finally, the geographic concentration of the evidence base in high-income, Western countries, inherited from the underlying literature rather than introduced by the review process, limits the extent to which these findings can be generalized globally. A subgroup meta-analysis using commonly validated instruments such as the PHQ-9 and GAD-7, alongside standardized measures of daily hours of use, could have provided quantitative effect sizes to complement and strengthen the narrative findings.

5.9 Implications

Findings from this study suggest that clinical and educational assessment should move beyond screen-time duration to consider the pattern and quality of adolescent social media use. This specifically includes the degree of compulsivity/problematic use, balance between passive v/s active engagement, sleep displacement and making individuals vulnerable to cyberbullying or harassment, with a particular focus on girls, who were more consistently vulnerable across the reviewed studies. For policy and educational settings, the null finding for a restrictive school phone-ban policy, set against the positive findings for a skills-based digital-balance and social-emotional-learning intervention [51], suggests that policy responses emphasizing digital literacy, self-regulation skills, and parental engagement are likely to be more effective than blanket restriction alone. For future research, this review indicates a clear need for exposure measures with established validity and reliability, ideally supplemented by device-recorded data; for cohort studies that explicitly establish baseline freedom from depressive and anxiety symptoms and that report and address loss to follow-up; for more experimental and intervention research capable of establishing causal direction; for research explicitly modelling non-linear, dose-response relationships, particularly for anxiety; and for expansion of this evidence base beyond its current concentration in high-income, Western countries.

6 Conclusion

This systematic review synthesized evidence from fifty cross-sectional and cohort studies examining the association between social media screen time and depression and anxiety among adolescents aged 10 to 19 years. The weight of evidence indicates the presence of a consistent, and increasingly well-evidenced, positive association between social media use and depressive symptoms, which is strengthened by recent within-person cohort analyses, in conjunction with a weaker, less consistent, and a non-linear association with anxiety in certain places. These relationships are profoundly shaped by gender, sleep, cyberbullying, pattern and content of use, family and peer context, which is indicating that influence of social media on adolescent mental health is mediated by a set of identifiable and modifiable pathways rather than through exposure duration.

Methodological appraisal using the JBI checklists is characterized by a generally sound but not flawless evidence base, thwarted predominantly by unvalidated exposure measurement and an incomplete assurance of baseline symptom status for cohort studies. These findings support a shift in practice, policy, and research attention beyond blanket screen-time limits, and towards a targeted, skills-based approach which address how, not merely how much, adolescents engage with social media.

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Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

Data sharing is not applicable to this study as no new datasets were generated or analyzed during the current study. All data supporting the findings are derived from previously published articles, as cited in the manuscript

AI Usage Disclosure

The author used AI-assisted tools like ChatGPT for language editing; all content was reviewed and verified by the author

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