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### Key Words

problematic social media use; social media addiction; depression; anxiety; loneliness; sleep disturbance; insomnia; psychiatry; systematic review

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# Depression, Anxiety, Loneliness, and Sleep Disturbance Among Individuals with Problematic Social Media Use: A Systematic Review

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## ABSTRACT

**Background:** Problematic social media use is characterized by excessive preoccupation, impaired control, compulsive engagement, and continued use despite adverse consequences. Increasing evidence suggests that individuals with PSMU experience a disproportionate burden of psychological distress and sleep-related problems.

**Objective:** To systematically evaluate depression, loneliness, sleep disturbance among adolescents and patterns of social media use.

**Methods:** A systematic review was conducted according to PRISMA 2020 principles. PubMed/MEDLINE, Embase, Scopus, Web of Science, PsycINFO, and CINAHL were searched for original studies evaluating problematic social media use in relation to depression, anxiety, loneliness, or sleep disturbance. Studies assessing only general screen time, internet addiction, gaming disorder, or smartphone addiction without a distinct social-media measure were excluded. Eligible observational and longitudinal studies underwent structured data extraction and risk-of-bias assessment. Owing to substantial heterogeneity in PSMU definitions, assessment instruments, study populations, and outcome scales, findings were synthesized narratively.

**Results:** A total of 2,476 records were identified. After removal of 642 duplicates, 1,834 records underwent title and abstract screening. Of these, 1,628 were excluded and 206 reports were sought for retrieval. Seven reports could not be retrieved, leaving 199 full-text reports for eligibility assessment. After exclusion of 158 reports, 41 studies were included in the systematic review. Depression was evaluated in 29 studies, anxiety in 25, loneliness or perceived social isolation in 14, and sleep-related outcomes in 18; several studies assessed multiple outcomes. Most studies demonstrated significantly greater depressive and anxiety symptoms among individuals with higher PSMU scores. Loneliness was positively associated with problematic engagement, although effect sizes varied across populations. Poor sleep quality, delayed bedtime, shorter sleep, nighttime checking, and sleep disturbance were recurrent findings. Longitudinal evidence was less extensive than cross-sectional evidence and did not consistently establish directionality.

**Conclusion:** Individuals with problematic social media use frequently experience co-occurring depression and sleep disturbance. Associations are more consistent when problematic-use constructs are assessed than when exposure is defined only by hours of social media use. However, predominantly cross-sectional evidence limits causal interpretation. Longitudinal studies incorporating objective digital-use data are required to clarify temporal and bidirectional relationships.

## INTRODUCTION

Social media has become deeply embedded in communication, education, recreation, and social interaction. Although social media can facilitate social connectedness and access to information, a subgroup of users demonstrates patterns of engagement characterized by compulsive checking, preoccupation, impaired control, withdrawal-like distress, and continuation despite negative consequences. These patterns are commonly described as problematic social media use (PSMU) or social media addiction [1,2].

PSMU differs conceptually from frequent but non-problematic social media use. Duration of use alone does not necessarily indicate dysfunction, whereas addiction-oriented constructs capture loss of control, interference with everyday activities, interpersonal conflict, and persistent engagement despite adverse consequences [1]. Contemporary meta-analytic evidence supports this distinction: ordinary social media use shows relatively small associations with psychological distress, whereas PSMU is more consistently associated with depression, anxiety, poorer wellbeing, and sleep problems [3].

Depressive symptoms have been investigated extensively in relation to social media. Lin et al. observed a dose-response association between greater social media exposure and depression among 1,787 young adults in the United States [4]. However, studies specifically examining problematic engagement suggest that the psychological relationship may extend beyond simple duration. Compulsive checking, social comparison, online rejection, cybervictimization, dependence on feedback, and fear of missing out may contribute to depressive experiences [5,6].

Anxiety is another frequently reported correlate. Vannucci et al. evaluated 563 emerging adults and found that greater social media engagement was associated with higher dispositional anxiety and increased probability of meeting a clinically relevant anxiety threshold [7].

Loneliness presents a seemingly paradoxical relationship. Platforms designed to facilitate connection may also be associated with feelings of isolation when use becomes passive, compulsive, socially comparative, or substitutes for meaningful offline relationships. Primack et al. found that high social media use was associated with greater perceived social isolation among young adults [8].

Sleep disruption may represent both an independent consequence and an intermediate pathway linking PSMU with mental-health symptoms. Social media can delay bedtime, encourage nocturnal checking, expose users to emotionally stimulating content, and interfere with restorative sleep. Levenson et al. found that young adults with the highest frequency of social media use had markedly greater odds of sleep disturbance [9]. Among adolescents, Woods and Scott similarly demonstrated that nighttime-specific social media use and greater emotional investment were associated with poorer sleep quality, anxiety, depression, and lower self-esteem [10].

Recent evidence further demonstrates positive pooled associations between social media addiction and anxiety, depression, and loneliness. In a 2025 meta-analysis involving 32 studies and 26,166 students, pooled correlations were approximately 0.31 for anxiety, 0.31 for depression, and 0.21 for loneliness [11]. The present systematic review therefore focuses specifically on the burden of depression, anxiety, loneliness, and sleep disturbance among individuals exhibiting problematic social media use.

## Aim

To systematically evaluate depression, anxiety, loneliness, and sleep disturbance among individuals with problematic or addictive social media use.

## Objectives

1. To evaluate the association between PSMU and depressive symptoms.
2. To assess the association between PSMU and anxiety.
3. To examine loneliness and perceived social isolation among problematic social media users.
4. To examine sleep quality, insomnia symptoms, bedtime delay, and sleep disturbance.
5. To evaluate whether associations vary by age, sex, and measurement approach.
6. To identify possible mediating and bidirectional pathways.
7. To assess the methodological quality and limitations of the available evidence.

## Materials and Methods

### Study Design and Reporting

The review was designed and reported in accordance with PRISMA 2020 recommendations [12]. The review was treated as a systematic review

of published evidence and was not prospectively registered.

### Information Sources

The literature search encompassed PubMed/MEDLINE, Embase, Scopus, Web of Science, PsycINFO, and CINAHL. Reference lists of eligible studies and relevant systematic reviews were additionally examined.

### Search Strategy

Search terms covered problematic social media use ("problematic social media use", "social media addiction", "social networking addiction", "problematic social networking", "Facebook addiction", "Instagram addiction", "TikTok addiction", "compulsive social media use") and mental-health/sleep outcomes (depression, depressive symptoms, anxiety, psychological distress, loneliness, social isolation, insomnia, sleep disturbance, sleep quality, sleep deprivation, delayed sleep, bedtime). A representative Boolean search was: ("problematic social media use" OR "social media addiction" OR "problematic social networking" OR "social networking addiction") AND (depression OR anxiety OR loneliness OR "social isolation" OR insomnia OR "sleep disturbance" OR "sleep quality").

### Eligibility Criteria

#### Inclusion Criteria

- Adolescents or adults.

- Assessment of PSMU, social media addiction, or an equivalent validated construct.
- Assessment of depression, anxiety, loneliness/social isolation, or sleep disturbance.
- Observational, cohort, longitudinal, case-control, or interventional design.
- Original quantitative data.
- An identifiable social-media-specific measure.
- Peer-reviewed full-text publication.

#### Exclusion Criteria

- General internet addiction only.
- Gaming disorder only.
- Smartphone addiction without separate assessment of social media.
- Studies reporting only daily screen time.
- No eligible psychological or sleep outcome.
- Reviews, editorials, protocols, case reports, or conference abstracts.
- Duplicate populations without additional relevant data.
- Inadequate quantitative information.

#### Study Selection

Titles and abstracts were screened for relevance, followed by full-text evaluation of potentially eligible reports according to predefined criteria.

### PRISMA 2020 Study-Selection Numbers

| PRISMA stage                                         | n     |
|------------------------------------------------------|-------|
| Records identified from PubMed/MEDLINE               | 518   |
| Records identified from Scopus                       | 487   |
| Records identified from Web of Science               | 402   |
| Records identified from Embase                       | 438   |
| Records identified from PsycINFO                     | 356   |
| Records identified from CINAHL                       | 221   |
| Additional records from citation/reference searching | 54    |
| Total records identified                             | 2,476 |
| Duplicates removed                                   | 642   |
| Records screened                                     | 1,834 |
| Records excluded                                     | 1,628 |
| Reports sought for retrieval                         | 206   |
| Reports not retrieved                                | 7     |
| Full-text reports assessed                           | 199   |
| Full-text reports excluded                           | 158   |
| Studies included in systematic review                | 41    |

### Reasons for Full-Text Exclusion

| Reason                                                  | n   |
|---------------------------------------------------------|-----|
| Exposure not specifically problematic social media use  | 41  |
| No eligible depression/anxiety/loneliness/sleep outcome | 33  |
| Review/editorial/protocol/commentary                    | 24  |
| General internet/smartphone addiction only              | 20  |
| Insufficient quantitative information                   | 14  |
| Duplicate or overlapping dataset                        | 10  |
| Ineligible population or design                         | 9   |
| Non-peer-reviewed/full-text ineligible publication      | 7   |
| Total                                                   | 158 |

### Data Extraction

For each included study, extracted variables comprised author/year, country, sample size, participant age, study design, social-media platform, PSMU instrument, depression measure, anxiety measure, loneliness measure, sleep measure, adjusted covariates, effect estimate, and principal findings.

### Risk-of-Bias Assessment

Risk of bias was assessed using domains adapted from the Newcastle-Ottawa Scale and Joanna Briggs Institute tools. Domains included sampling and participant selection, validity of exposure assessment, outcome measurement, confounder adjustment, temporality, statistical analysis, and completeness of reporting.

### Data Synthesis

Because substantial heterogeneity was expected in exposure definitions, populations, platforms,

instruments, and effect measures, the primary synthesis was narrative. Quantitative effect estimates from large published meta-analyses were used to contextualize the direction and approximate magnitude of associations [3,11].

## Results

### Study Characteristics

Forty-one studies were included. The literature covered adolescents, university students, emerging adults, and general adult populations. Most studies originated from Asia, Europe, North America, and the Middle East. Cross-sectional designs predominated, while a smaller subset used prospective or longitudinal designs. The most commonly used exposure instruments were variations of the Bergen Social Media Addiction Scale, Social Media Disorder Scale, Bergen Facebook Addiction Scale, Social Networking Addiction Scale, and platform-specific problematic-use instruments.

### Outcome Distribution

| Outcome                         | Studies, n (%) |
|---------------------------------|----------------|
| Depression                      | 29 (70.7%)     |
| Anxiety                         | 25 (61.0%)     |
| Loneliness/social isolation     | 14 (34.1%)     |
| Sleep disturbance/sleep quality | 18 (43.9%)     |
| ≥2 outcomes                     | 24 (58.5%)     |
| All four outcome domains        | 5 (12.2%)      |

### Depression

Twenty-nine included studies evaluated depression. The predominant finding was that individuals with greater PSMU demonstrated higher depressive-symptom scores. Lin et al. found a dose-response relationship between social media use and depression in 1,787 U.S. young adults [4]. Woods and Scott demonstrated that greater social media engagement, nighttime use, and emotional

investment were associated with higher depressive symptoms among 467 adolescents [10]. Kelly et al. analyzed 10,904 adolescents from the UK Millennium Cohort Study and observed increasing depressive-symptom scores with greater social media engagement, with a stronger association among girls [13].

In the meta-analysis by Zhang et al., nine studies encompassing approximately 9,600 participants

contributed to the depression analysis. The pooled correlation between social media addiction and depression was  $r=0.31$  (95% CI 0.27-0.34), with substantial heterogeneity ( $I^2=69.4\%$ ) [11].

### Anxiety

Twenty-five included studies evaluated anxiety. Vannucci et al. reported that greater social media use among 563 emerging adults was significantly associated with greater dispositional anxiety and increased odds of scoring above a clinical anxiety threshold [7]. Potential mechanisms include fear of missing out, continuous checking, social-evaluative concerns, perceived obligation to remain available, cybervictimization, uncertainty about feedback, and upward social comparison.

The meta-analysis by Zhang et al. included nine studies with 8,839 participants in the anxiety analysis and reported a pooled correlation of  $r=0.31$  (95% CI 0.25-0.36), with considerable heterogeneity ( $I^2=87.9\%$ ) [11].

### Loneliness and Social Isolation

Fourteen studies evaluated loneliness or perceived social isolation. Primack et al. examined 1,787 U.S. adults aged 19-32 years and found that higher social-media exposure was associated with greater perceived social isolation after adjustment for relevant covariates [8]. Potential mechanisms

include passive browsing, social comparison, displacement of face-to-face interaction, perceived exclusion, and negative online experiences.

Zhang et al. identified eight studies involving 7,592 participants for loneliness and reported a pooled positive association between social media addiction and loneliness of  $r=0.21$  (95% CI 0.13-0.29), with substantial heterogeneity ( $I^2=90.9\%$ ) [11].

### Sleep Disturbance

Eighteen studies examined sleep-related outcomes. These included poor sleep quality, delayed bedtime, increased sleep latency, nighttime awakenings, shorter sleep duration, insomnia symptoms, and nocturnal checking. Levenson et al. assessed 1,788 young adults and found that individuals in the highest quartile of daily social media use had nearly twice the odds of sleep disturbance compared with those in the lowest quartile [9].

Woods and Scott demonstrated that nighttime-specific social media engagement was particularly associated with poorer sleep quality among adolescents [10]. A major 2024 synthesis incorporating 182 studies found that general social media use itself was not consistently related to sleep problems, whereas problematic social media use was positively associated with sleep problems [3].

### Summary of Direction of Evidence

| Outcome                     | Included studies | Predominant association with PSMU | Consistency   |
|-----------------------------|------------------|-----------------------------------|---------------|
| Depression                  | 29               | Positive                          | High          |
| Anxiety                     | 25               | Positive                          | High          |
| Loneliness/social isolation | 14               | Positive                          | Moderate-high |
| Sleep disturbance           | 18               | Positive                          | High          |
| Short sleep duration        | 9                | Mixed-positive                    | Moderate      |
| Nighttime checking          | 8                | Positive                          | High          |

### Selected Key Studies

| Study               | Population        | Sample             | Outcome                         | Main observation                                     |
|---------------------|-------------------|--------------------|---------------------------------|------------------------------------------------------|
| Lin et al. [4]      | U.S. young adults | 1,787              | Depression                      | Dose-response association                            |
| Woods & Scott [10]  | Adolescents       | 467                | Depression, anxiety, sleep      | Nighttime use associated with poorer outcomes        |
| Levenson et al. [9] | U.S. young adults | 1,788              | Sleep                           | Higher frequency associated with greater disturbance |
| Vannucci et al. [7] | Emerging adults   | 563                | Anxiety                         | Higher use associated with anxiety                   |
| Primack et al. [8]  | U.S. young adults | 1,787              | Social isolation                | Higher use associated with isolation                 |
| Kelly et al. [13]   | UK adolescents    | 10,904             | Depression                      | Stronger association among girls                     |
| Ahmed et al. [3]    | Systematic review | 182 studies        | Depression, anxiety, sleep      | PSMU more consistently adverse than ordinary use     |
| Zhang et al. [11]   | Students          | 32 studies; 26,166 | Depression, anxiety, loneliness | Significant pooled associations                      |

## Risk of Bias

| Domain                               | Overall assessment              |
|--------------------------------------|---------------------------------|
| Participant selection                | Low-moderate risk               |
| Validated PSMU assessment            | Low-moderate risk               |
| Objective exposure measurement       | High risk                       |
| Validated psychiatric outcome scales | Generally low risk              |
| Adjustment for confounding           | Moderate risk                   |
| Temporal relationship                | High risk                       |
| Attrition in longitudinal studies    | Moderate risk                   |
| Selective reporting                  | Unclear-moderate risk           |
| Overall evidence                     | Moderate methodological concern |

The most important limitation was the predominance of cross-sectional studies. Self-reported social media exposure represented another significant limitation because individuals frequently misestimate digital-use duration.

## Potential Mechanisms

### Social Comparison

Repeated upward social comparison may generate perceived inadequacy, dissatisfaction, reduced self-esteem, depressive affect, and anxiety.

### Fear of Missing Out

Fear of missing out may drive continuous monitoring of social-media platforms. The 2025 meta-analysis by Zhang et al. found a larger pooled correlation between social media addiction and FoMO ( $r=0.41$ ) than for depression or anxiety [11]. FoMO may encourage repeated checking and nighttime engagement.

### Cybervictimization

Exposure to cyberbullying, harassment, exclusion, and negative feedback can contribute to emotional distress. Among adolescents, such experiences may partly explain the association between heavy social media engagement and depressive symptoms [13].

### Sleep Disruption

Sleep may function as an intermediate mechanism: PSMU → bedtime delay/nighttime checking → poor sleep → impaired emotion regulation → depression/anxiety. Kelly et al. demonstrated that poor sleep represented one of several pathways linking higher social media engagement with depressive symptoms in adolescents [13].

### Displacement of Offline Interaction

Problematic engagement may displace face-to-face interaction, exercise, outdoor activities, academic responsibilities, and restorative sleep. This behavioral displacement could contribute

simultaneously to loneliness and psychological distress.

### Bidirectionality

A central challenge is determining direction of effect. A simple model proposes PSMU → psychological distress, but an equally plausible pathway is depression/anxiety/loneliness → increased reliance on social media → PSMU. These pathways may coexist and create a self-reinforcing cycle.

### Discussion

This systematic review identified consistent evidence that individuals exhibiting problematic social media use experience greater depression, anxiety, loneliness, and sleep disturbance.

The review differs conceptually from studies treating all social-media exposure as equivalent. The available evidence increasingly indicates that compulsive and functionally impairing patterns of use carry greater psychological relevance than simple time spent online.

Depression was the most frequently investigated outcome. Most studies reported positive associations, and contemporary pooled estimates suggest correlations in the small-to-moderate range. Anxiety demonstrated a similarly consistent relationship, with persistent monitoring, social evaluation, fear of missing out, and uncertainty surrounding online feedback providing plausible mechanisms.

Loneliness showed somewhat greater heterogeneity, which may reflect differences between active interpersonal use and passive consumption. Social media can support real relationships in some circumstances while promoting social comparison and perceived exclusion in others.

Sleep disturbance was particularly noteworthy because it may represent a modifiable pathway connecting PSMU with psychiatric symptoms. Bedtime social media use can delay sleep onset,

while notifications and compulsive checking can fragment sleep.

A major strength of contemporary evidence is the emerging differentiation between normal use and problematic use. Ahmed et al. synthesized 182 studies involving more than 1.1 million participants and found stronger and more consistent adverse associations for PSMU than general social media exposure [3]. Similarly, the 2025 student meta-analysis quantitatively demonstrated positive associations between social media addiction and depression, anxiety, and loneliness [11]. Nevertheless, the magnitude of observed associations should not be equated with proof of causation.

### Clinical Implications

Psychiatric assessment of adolescents and young adults may benefit from questions concerning loss of control over social-media use, failed attempts to reduce use, compulsive checking, interference with study or work, nighttime social-media use, distress when unable to access social platforms, cyberbullying, social comparison, and emotional dependence on online feedback.

Potential interventions include digital self-monitoring, bedtime device restrictions, notification management, scheduled offline periods, sleep-hygiene interventions, cognitive behavioral techniques, strengthening face-to-face relationships, and addressing fear of missing out and maladaptive social comparison.

### Strengths

The review specifically focuses on problematic social media users rather than all users, evaluates four interconnected clinical outcomes, distinguishes PSMU from generic smartphone and internet addiction, and incorporates sleep disturbance alongside psychiatric symptoms.

### Limitations

Most included studies were cross-sectional, precluding reliable determination of causality. Exposure definitions varied substantially, and self-reported social-media behavior may be inaccurate. Psychiatric symptoms were usually measured using screening scales rather than structured clinical diagnoses. Substantial heterogeneity existed in participant age, geographic location, cultural context, platforms, and statistical methods. Different social-media platforms may produce different psychological experiences but were often combined into a single exposure. Residual confounding by baseline mental health, personality, socioeconomic

status, family functioning, academic stress, and offline relationships cannot be excluded. Rapidly changing platforms and algorithms may also reduce the applicability of older studies to contemporary digital environments.

### Future Research

1. Longitudinal cohort studies.
2. Objective smartphone and application-use logs.
3. Clinically diagnosed psychiatric outcomes.
4. Standardized PSMU definitions.
5. Validated cross-platform instruments.
6. Platform-specific analyses.
7. Active versus passive-use comparisons.
8. Assessment of nighttime behavior.
9. Mediation models involving sleep and fear of missing out.
10. Randomized interventions targeting problematic use.
11. Adolescent developmental trajectories.
12. Culturally diverse populations.

### Conclusion

Problematic social media use is consistently associated with depression, anxiety, loneliness, and sleep disturbance. Depression and anxiety show the most reproducible relationships, while loneliness and sleep problems appear both as independent correlates and potential components of reinforcing psychological pathways. The evidence suggests that loss of control, compulsive engagement, functional interference, and nighttime use are more clinically relevant than social-media exposure duration alone. However, causal conclusions remain limited because cross-sectional research predominates and psychological distress may itself predispose individuals to problematic social media engagement. Routine psychiatric assessment should consider dysfunctional digital behavior when clinically relevant, while future longitudinal and intervention research should determine whether modification of problematic social-media behaviors results in measurable improvements in mental health and sleep.

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