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The effects of social media platforms on the mental well-being of children: A systematic-review

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Abstract
Given the increasing use of social networks among children and adolescents, this systematic review aims to assess the impact of social media use (SMU) on teenage mental health. Google Scholar, PubMed, Web of Science, Science Direct, and Cochrane Library were searched. Study articles were screened by title and abstract using Rayyan QCRI, then implemented a full-text assessment. A total of fifteen studies with 327134 patients were included. The number of social media accounts adolescents have and how frequently they check them are related to loneliness, FOMO, impulsivity, hyperactivity, and anxiety. Adolescents frequently had problematic SMU, which was indicative of poor mental health, worsened depressive symptoms, and was related to low self-esteem. SMU seems to have a negative effect on teenage mental health for both genders, as both genders reported higher levels of loneliness and depressive symptoms.

Keywords: social media use, adolescents, mental health, systematic review

Introduction

More than ten years ago, the spread of mobile Internet connectivity coincided with the creation of smartphones. With so-called social network sites (SNS) on the Internet, this invention made it possible for social networks to grow and spread. SNS are web-based services that let users create public or semi-public profiles within constrained systems, articulate a list of other users with whom they have connections, and browse and navigate their own list of connections as well as those produced by others. SNS thereby facilitates communication as well as the development and upkeep of relationships [1].

The average age at which youngsters acquire their first smartphone today is 9 years old in the United Kingdom and 10 years old in Germany [2]. The majority of children and adolescents use SNS today in the majority of high-income nations. 85% of teenagers in Germany (ages 12 to 17) use social media every day for an average of 166 minutes. In conclusion, social network significantly Impact on the lives of our children and teenagers [3].

Due to the early stage of social media, earlier research was limited to the Internet and the ideas of self-esteem and well-being. The majority of Internet usage was for informational purposes only; social contact was not practiced online. The Home net research [4], a common study at the time, claimed that using the Internet for even three hours a week increased depression levels and decreased "social support" (defined as the perception that someone is being cared for). Adolescents were shown to be the group most susceptible to these harmful outcomes.

Social networking sites and their connection to well-being and self-esteem have received more attention in more recent studies [5, 6]. Positive feedback on a young person's profile on the social networking site CU2 (See You Too) was found to increase self-esteem and well-being, whereas negative feedback was found to lower both in a Dutch study including 881 young people [6].

The Australian Bureau of Statistics reports that many kids and teenagers access social networking sites via the Internet, making this platform a potentially successful means of reaching this demographic. Social networking sites can be used as part of a comprehensive outreach strategy to reach large and diverse youth populations with important health information that is quick, frequent, and tailored, according to a study that examined an outreach program for teen pregnancy in low-income communities in California [7].

This review study aims to evaluate what has been discovered on the potential health effects given the widespread usage of social networks among children and young people. The purpose of this study is to determine how social media affects adolescents' health.

Methodology

This systematic review was conducted in accordance with accepted standards (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, PRISMA) [8].

Study design and duration

This was a systematic review conducted between March 2022 to April 2023.

Search strategy

A thorough search of five major databases, including Google scholar, PubMed, Web of Science, Science Direct, and Cochrane Library, was done to find the relevant literature. We restricted our search to English and considered each database's unique requirements. The following keywords were converted into PubMed Mesh terms and used to find the relevant studies; "Social media," "Children," " Adolescents," "Teenagers," "School students," "Pediatric," "Mental well-being," and "Mental health." The Boolean operators "OR" and "AND" matched the required keywords. Publications with full English text, available free articles, and human trials were among the search results.

Selection criteria

We considered the following criteria for inclusion in this review

- Study designs that assessed the effect of SMU on adolescents.
- Participants younger than 18 years.
- We excluded participants who are psychiatrically hospitalized.
- English language.
- Free accessible articles.

Data extraction

We applied Rayyan (QCRI) to detect duplicates in the output of the search strategy [9]. The researchers used a set of inclusion/exclusion criteria to refine the combined search results in order to evaluate the relevance of the titles and abstracts. The reviewers carefully read each paper that met the criteria for inclusion. The authors talked about ways to resolve conflicts. The authorized study was uploaded using a data extraction form that had been created. The authors extracted data about the study titles, authors, study year, country, participants, gender, SMU scale, mental health scale, and main outcomes.

Strategy for data synthesis

To provide a qualitative analysis of the results and study components included, summary tables were created using the data gathered from the relevant studies. After the data for the systematic review had been extracted, the most efficient method for using the data from the included study articles was chosen. Studies that met the full-text inclusion criteria but did not provide data on the impact of social media on adolescents' mental well-being were excluded.

Risk of bias assessment

The ROBINS-I risk of bias assessment method for non-randomized trials of treatments was used to assess the quality of the included studies [10]. The seven topics that were assessed included confounding, participant selection for the study, classification of interventions, deviations from intended interventions, missing data, assessment of outcomes, and selection of the reported result.

Results

Search results

A total of 560 study articles resulted from the systematic search, and 63 duplicates were deleted. Title and abstract screening were conducted on 497 studies, and 402 studies were excluded. 95 reports were sought for retrieval, and only 15 articles were not retrieved. Finally, 80 studies were screened for full-text assessment; 35 were excluded for wrong study outcomes, 16 for unavailable data on the impact of SMU on adolescents' mental health, and 15 for the wrong population type. Fifteen eligible study articles were included in this systematic review. A summary of the study selection process is presented in Fig 1.

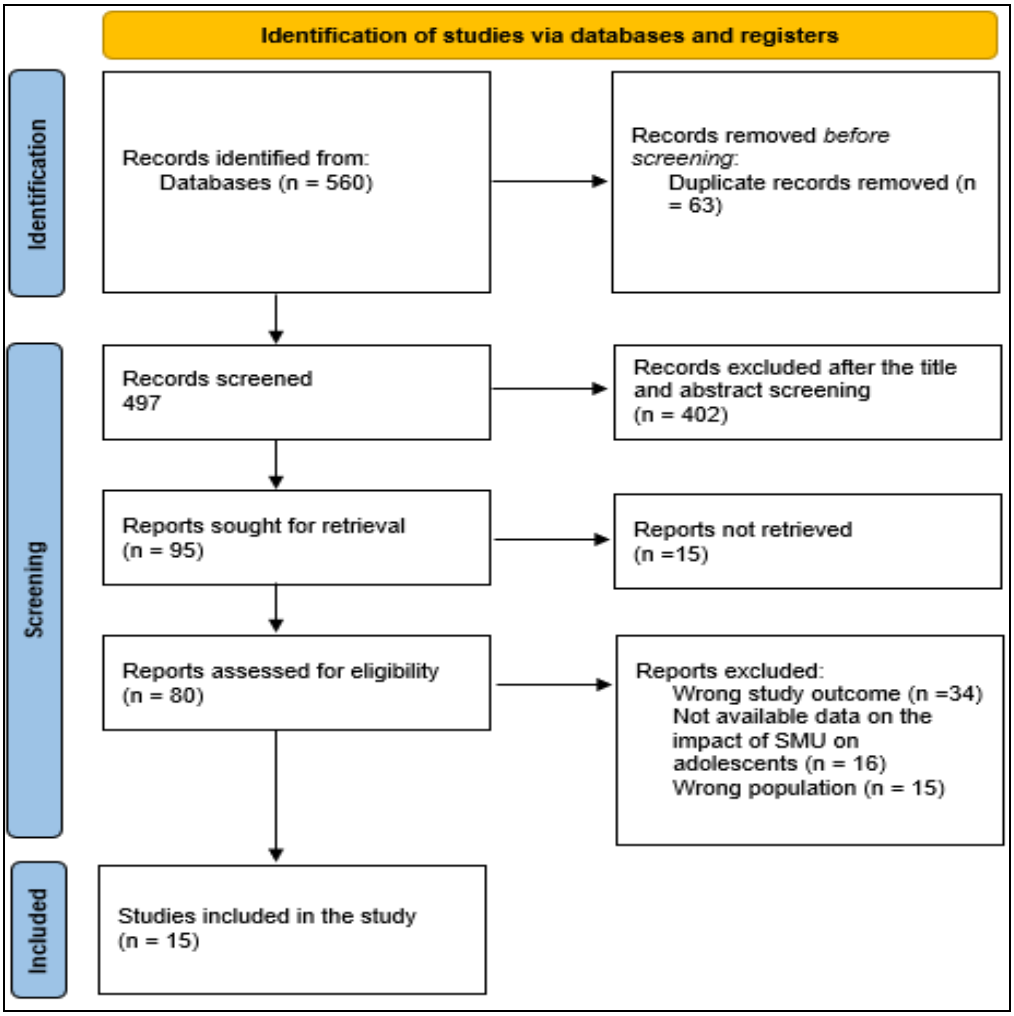

Fig 1: PRISMA flowchart summarizes the study selection process.

Characteristics of the included studies

Table 1

includes the sociodemographic characteristics. A total of fifteen study articles with 327134 patients were included. Five studies were conducted in the UK [17, 21, 22, 24, 25], four in the USA [11, 13,15, 20], two in Estonia [14, 18], two in Norway [16, 19], one in Sweden [23], and one was multi-centered [12].

Table 2

presents the characteristics of the included studies. SMU was assessed using self-administrated questionnaires in five studies [16, 17, 19, 23, 24], interviews were conducted in three studies [20-22], and other studies used different scales. Interviews were used only in three studies [20-22] to assess adolescents' mental health.

The concept of fear of missing out (FoMO) was introduced in one study, which found that the number of accounts that adolescents have on social media and the frequency of checking it were partially positively correlated with loneliness and FoMO, as well as with hyperactivity/impulsivity, anxiety, and sadness [11]. Problematic SMU was prevalent among adolescents [24]. It was demonstrated that problematic SMU was a sign of low well-being across all analyzed domains and countries [12], increased depressive symptoms [18], and was adversely connected with self-esteem and correlated with high anxiety levels [24].

Adolescents' frequent SMU and perceptions of the value of social contacts are linked to daytime sleepiness [13, 14]. SMU appeared to have a negative impact on adolescent mental health for both boys and girls [15], with high levels of depressive symptoms [19] and reported higher degrees of loneliness [25]. The adolescents desired to be less obsessed with social media and struggled to handle social media and real-life [16]. Social media seems to have the ability to encourage good mental health [21].

Table 1: Sociodemographic characteristics of the included participants.

Study	Country	Participants	Mean age	Gender
Barry *et al*., 2017 [11]	USA	226	15.3 ± 1.02	NM
Boer *et al*., 2020 [12]	Multi-centered	154,981	13.5 ± 1.6	NM
Hamilton and Lee, 2021 [13]	USA	4153	14.6 ± 1.7	1929 (46.5)
Raudsepp, 2019 [14]	Estonia	249	15.3 ± 0.3	133 (53.3)
Lee *et al*., 2022 [15]	USA	5114	12 - 14	2623 (513)
Hjetland *et al*., 2021 [16]	Norway	27	16.8	NM
Twigg *et al*., 2020 [17]	UK	7596	10 - 15	3805 (50.1%)
Raudsepp and Kais, 2019 [18]	Estonia	397	12.6 ± 0.7	0
Bonsaksen *et al*., 2023 [19]	Norway	139841	13 - 19	68,027 (48.6)
van Rensburg *et al*., 2016 [20]	USA	20	14-18	5 (25)
O'Reilly *et al*., 2019 [21]	UK	30	11 - 18	6 (20)
O'reilly *et al*., 2020 [22]	UK	54	11 -18	30 (55.6)
Beeres *et al*., 2021 [23]	Sweden	3501	14-15	1736 (49.6)
Kelly *et al*., 2018 [24]	UK	10904	14.3 ± 0.3	5408 (49.6)
Azhari *et al*., 2022 [25]	UK	41	17.8 ± 0.8	0

Table 2: Characteristics and outcomes of the included studies.

Study	Social media use scale	Mental health scale	Key findings	ROBIN-I
Barry *et al*., 2017 [11]	Social media survey- adolescent version	Diagnostic and Statistical Manual of Mental Disorders (DSM-5)	The number of accounts that adolescents have on social media and the frequency with which they check it on their own were partially positively correlated with loneliness and FoMO, as well as with hyperactivity/impulsivity, anxiety, and sadness, as reported by parents.	
Boer *et al*., 2020 [12]	The 9-item Social Media Disorder Scale	Cantril's ladder	Depending on the well-being domain and country context, adolescents' intense SMU was either positively or negatively correlated with their well-being, but problematic SMU was a sign of low well-being across all analyzed domains and countries. More precisely, intense users reported more frequent psychological symptoms, less life satisfaction, and worse levels of family support in nations with a low prevalence of intense SMU.	
Hamilton and Lee, 2021 [13]	The Adolescents' Digital Technology Interactions and Importance Scale	Adolescents' Digital Technology Interactions and Importance Scale	The correlations between a substantial, nationally representative sample of adolescents' use of social media and perceptions of the value of social interactions during the day. Daytime sleepiness strongly predicts and is connected with young people's mental health issues, such as depression and suicide, which are serious public health challenges.	
Raudsepp, 2019 [14]	Bergen Social Media Addiction Scale (BSMAS)	Epidemiologic Studies Depression Scale (CES-D) and The Insomnia Severity Index (ISI)	Adolescents' frequent SMU and perceptions of the value of social contacts are linked to daytime sleepiness. Additionally, SMU and perceived relevance were most likely to impact adolescents who did not have parental guidelines for technology use before bed.	
Lee *et al*., 2022 [15]	NM	Global Appraisal of Individual Needs-Short Screener (GAIN-SS)	Although the growing course of mental health and its interaction with other factors varied between boys and girls, SMU appeared to have a negative impact on adolescent mental health for both boys and girls.	
Hjetland *et al*., 2021 [16]	Self-reported questionnaire	Self-administrated questionnaire	The adolescents desired to be less obsessed with social media and struggled to handle social media and real life. Because social media is so appealing and adolescents' self-control abilities are still developing, efforts to control SMU should instead enlist the help of parents, educators, policymakers, and social media companies, while acknowledging the value of social media as a platform for peer interaction.	
Twigg *et al*., 2020 [17]	Self-reported questionnaire	General Health Questionnaire (GHQ)	SMU in moderation has little impact on how happy children are with their lives. More research is required to fully understand how this technology is being utilized, although higher use is linked to lower levels of happiness, especially for girls.	
Raudsepp and Kais, 2019 [18]	BSMAS	Depression Scale (CES-D)	Over two years, there was a relationship between problematic SMU and depressive symptoms; as problematic SMU increased, depressive symptoms also increased. Higher baseline depressive symptoms predicted a sharper increase in problematic SMU with time.	
Bonsaksen *et al*., 2023 [19]	Predesigned questionnaire	Depressive Mood Inventory and the General Self-Efficacy Scale (GSE)	Adolescents showed higher levels of depressive symptoms in relation to unpleasant social media-related events, and research seemed that these events contributed to the relationship between time spent on social media and higher levels of depressive symptoms.	
van Rensburg *et al*., 2016 [20]	Interview	Interview	Adolescents may identify several situations in which it might be beneficial to communicate with mental health professionals via social media and are open to the notion of doing so. In order for social media to be a workable medium for communication between clinicians and adolescents with psychiatric illnesses.	
O'Reilly *et al*., 2019 [21]	Interview	Interview	Social media seems to have the ability to encourage good mental health. Adolescents commonly use social media and the internet to research mental health issues. Using social media in this fashion has advantages and disadvantages. Despite its hazards and difficulties, social media can effectively reach and educate adolescents about mental health.	
O'reilly *et al*., 2020 [22]	Interview	Interview	Adolescents and mental health professionals seamlessly switched from touting the benefits of social media for safeguarding mental health and warning against excessive use of internet-connected devices. The distinction between "them" and "I" that adolescents made, separating any potential harm to their own mental health from that of more susceptible peers, was perhaps the most intriguing.	
Beeres *et al*., 2021 [23]	Self-reported questionnaire	Strength and Difficulties Questionnaire (SDQ)	The positive correlations between SMU and symptoms of mental illness were found to be between-person rather than within-person, and adolescents who used social media more frequently than their classmates also scored higher on the SDQ. Positive parallel relationships between the individual level SDQ scores for externalizing problems and deviations from the expected hours of SMU.	
Kelly *et al*., 2018 [24]	Self-reported questionnaire	the Mood and Feelings Questionnaire – short version (SMFQ)	Addiction to or problematic use of social media is fairly common among adolescents. Adolescents who use social media more frequently score higher on the CSIQ-A (The Classmates Social Isolation Questionnaire for Adolescents) questionnaire and typically feel more alone. Problematic SMU is adversely connected with self-esteem and favourably correlated with high levels of anxiety.	
Azhari *et al*., 2022 [25]	The Social Media Disorder (SMD) scale	Beck Anxiety Inventory (BAI), Short Loneliness scale, and Pittsburgh Sleep Quality Index (PSQI)	Users with SMD, on average, slept less than those without it, especially on the weekdays, and reported higher degrees of loneliness. Just often posting on Facebook was linked to lower sleep quality; general Facebook usage was not. These preliminary results demonstrated the potential for varied correlations between social media disorder and mental health and sleeping according to the platforms and usage.	

Discussion

This systematic review aims to study the impact of SMU on adolescents' mental health. Our review is limited by its qualitative analysis. Additionally, our results were also restricted by the heterogeneity between studies due to the wide variability in using different scales to evaluate SMU and mental well-being. The related outcome components are frequently assessed using a variety of scales and measures in studies. Because of this, it is challenging to combine and compare results from different studies, which is one of the main goals of systematic reviews.

One study that introduced the concept of "fear of missing out" (FoMO) indicated that the number of social media accounts that adolescents have and how often they check them was partially positively connected with loneliness, FoMO, hyperactivity/impulsivity, anxiety, and sadness [11]. Research on social media behavior has identified FoMO as a component that may help explain some reasons why people engage in more social media activity [26]. FoMO is defined by Przybylski *et al.* as "the need to stay continuously linked with what others are doing" (p. 1841) and concern about the idea that others may be having enjoyable experiences while one is not present [27]. FoMO is probably salient for certain adolescents since adolescence is a time when the urge to be linked to peers is at its peak and because many modern adolescent social connections and exchanges take place via social media [27]. According to Woods and Scott, people with limited social media access are more likely to experience higher levels of anxiety due to their emotional engagement in social media, which may be a sign of FOMO [28]. Young adults' use of social media and technology-related anxiety (such as worry over not monitoring social media) have been linked to symptoms of mood disorders [29]. Consequently, SMU may be associated with increased anxiety and mood-related symptoms in many adolescents, especially in those who are driven to use it due to subjective distress, such as FOMO.

The concept of problematic SMU was discussed in three studies and defined as a maladaptive pattern of SMU [30]. We found that problematic SMU was prevalent among adolescents [24] and was a sign of low well-being across all analyzed domains and countries [12], increased depressive symptoms [18], and was adversely connected with self-esteem and correlated with high anxiety levels [24]. In addition to using social media for its intended purposes, more and more teenagers are suffering the negative effects of improper SMU [30]. According to Andreassen, problematic SMU is characterized by an excessive concern with social media, a motivation to SMU, and a commitment to using social media that inhibits other social activities, studies, interpersonal relationships, mental health, and well-being. An increasing body of scientific research shows that problematic SMU may cause symptoms typically linked to substance addiction [31].

Adolescents' frequent SMU and perceptions of the value of social contacts are linked to daytime sleepiness [13, 14]. The potential reasons for the long-term consequences of sleep disruptions on depressive symptoms included both behavioral and neurobiological components. For instance, through impairing their cognitive performance and emotional regulation, sleep disturbances in teenagers may generally lead to a higher prevalence of depressive symptoms [32]. It is obvious that a great deal more longitudinal study is required, both to support the current findings and to clarify the nuanced relationships between problematic teenage SMU, sleep patterns, and depressive symptoms.

SMU appeared to have a negative impact on adolescent mental health for both males and females [15], with high levels of depressive symptoms [19] and reported higher degrees of loneliness [25]. These findings support the notion that, while time spent on social media is just one part of social media exposure, the content of SMU—what people encounter when using social media and as a result of that use—must be taken into account in connection to the implications for mental health. The findings support the idea that there is still a separate association between teenage SMU and depressive symptoms, even though they show that unpleasant SMU experiences are relevant to take into account. As recently proposed, this surviving relationship might be reciprocal or reversible [33].

The strong correlation between social media disorder and loneliness provided additional support for its existence. Consequently, loneliness results from a person's perception of the meaninglessness of relationships [34]. According to the etiology of loneliness, lonely people frequently engage in problematic socio-cognitive processes and negatively evaluate their interactions with others, which makes them miss out on social opportunities and exacerbates their loneliness [35].

Conclusion

The number of social media accounts that adolescents have and how often they check them was associated with loneliness, FoMO, hyperactivity/impulsivity, anxiety, and sadness. Problematic SMU was prevalent among adolescents and was a sign of low well-being, increased depressive symptoms, and was related to low self-esteem. SMU appeared to have a negative impact on adolescent mental health for both males and females, with high levels of depressive symptoms, and reported higher degrees of loneliness.

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