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RESEARCH ARTICLE

Problematic social media use in adolescents: A bibliometric analysis

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ABSTRACT

Problematic social media use (PSMU) among adolescents has emerged as a growing global concern due to its documented impact on mental health. This study provides a bibliometric analysis of research trends on adolescent PSMU by examining publications indexed in the Scopus database. Articles were mapped based on year of publication, country of origin, and associated psychological constructs. Using VOSviewer software, the study employed co-occurrence analysis to visualize relationships among recurring topics and keywords. The findings reveal a marked annual increase in publications on adolescent PSMU, with the United Kingdom and the United States leading in scholarly output. Prominent thematic trends include depression, mental health, well-being, healthy behaviors, addictive behaviors, anxiety, sleep disturbances, social support, and loneliness. These topics are clustered around both internal factors (e.g., self, emotion, cognition, personality) and external factors (e.g., peers, parents, family, social context, attachment). Frequently used methodological keywords include clinical studies, cross-sectional studies, controlled studies, and surveys. The implications of this analysis underscore its value as a reference point for future empirical investigations in the field.

Keywords: Bibliometric analysis; problematic social media use; adolescent, social media

1. Introduction

Adolescents represent the largest demographic group of internet users, as reported by the Indonesian Internet Service Providers Association. Individuals classified as Generation Z (born between 1997 and 2012) account for 31.4% of total internet users, with social media being the primary driver of usage, scoring 3.31 on a 4-point scale. Globally, PSMU has been recognized as an emerging concern, with multiple survey reports highlighting its prevalence among adolescents. A report by the World Health Organization (WHO) on adolescent social media use across Europe, Asia, and Canada revealed that female adolescents tend to report higher levels of PSMU. Moreover, 36% of adolescents were found to maintain continuous online interactions with peers and others, while socioeconomic status appeared to show minimal variation in relation to PSMU[1]. Literature focused on TikTok usage among adolescents further underscores the

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psychological risks associated with excessive use, including lower life satisfaction, heightened levels of depression and anxiety, as well as negative perceptions of body image and self-esteem[2].

Research on PSMU has received increasing scholarly attention in recent years; however, it remains in a developmental phase where more comprehensive theoretical modeling is still required. Several researchers have adopted literature review approaches to examine various dimensions of PSMU. For instance, existing reviews have explored the association between PSMU and parenting roles, including positive parent–child relationships, family climate, internet-based parenting strategies, general parenting practices, and parental phubbing[3]. Another review emphasized the need for further conceptual clarity, as PSMU has been described as closely resembling behavioral addiction in its structural characteristics[4]. Additional literature reviews have reported that PSMU is linked to negative outcomes such as impaired performance, adverse psychological effects, work–life conflict, and inconsistencies in outcomes across different cultural contexts[5]. Further studies have revealed that PSMU found significant associations between PSMU and grandiose narcissism, but more details on the type of platform used need to be reviewed[6].

Bibliometric analyses related to PSMU have been conducted, with several studies examining its intersection with social media addiction, however, these investigations have not been specifically focused on adolescent populations[7]. Additional bibliometric inquiries into social media addiction have been undertaken by various scholars[8,9]. Despite the growing body of bibliometric research on PSMU and its relation to social media addiction, a gap remains in the literature concerning its specific application to adolescents. This study aims to address that gap by providing a focused bibliometric analysis within this distinct demographic group.

Bibliometric research plays a crucial role due to its diverse and targeted objectives. With a growing number of publications indexed in reputable international databases such as Scopus, Web of Science (WoS), PubMed, and PsycINFO, there is a need for preliminary mapping to navigate the vast body of literature. Bibliometric methods aim to analyze and map the structural patterns of scholarly output within a given research domain. Common techniques include citation analysis, co-citation analysis, bibliographic coupling, keyword co-occurrence mapping, and the examination of journal source distribution. This approach provides valuable insights into the intellectual landscape of a field and can help identify gaps and directions for future research[10,11].

The application of bibliometric methods in the field of psychology has demonstrated a positive trajectory over time. Within the Anglo-American research community, there has been a notable increase in the volume of publications and the emergence of diverse subfields, highlighting the value of bibliometric analysis in systematically mapping psychological research domains[12]. In psychotherapy research, bibliometric approaches have proven useful in examining the intersection between psychology and related disciplines such as psychiatry, providing insights into interdisciplinary influence and knowledge integration[13]. Between 1999 and 2021, bibliometric studies have revealed a growing research focus on positive psychology, including themes related to positive psychological interventions and subjective well-being[14].

Given the growing need for a global understanding of PSMU and its implications for shaping future research directions, a bibliometric investigation focusing specifically on adolescents is both timely and essential. This study is guided by the following research questions: (1) What are the annual publication trends related to PSMU in adolescents? (2) Which countries contribute most actively to the literature on this topic? (3) What are the dominant themes and topics based on author keywords? (4) How are internal and external psychological factors represented in the literature on adolescent PSMU? (5) What methodological trends can be identified through keyword analysis related to research design and study type?

2. Literature review

PSMU is characterized by a pattern of uncontrolled and compulsive engagement with social media platforms, which has been linked to a range of mental health concerns[15]. The concept of PSMU initially emerged from early investigations into Facebook addiction, prompting researchers to call for the development of broader and more comprehensive measurement tools that capture problematic use across a variety of widely used social media platforms[16].

Factors associated with PSMU in adolescents can be broadly categorized into internal and external domains. A recent meta-analysis revealed that personality traits are significantly linked to PSMU, underscoring the role of individual psychological predispositions[17]. Adolescent girls with higher levels of global emotional intelligence, emotional regulation abilities, and emotional self-appraisal were found to be at increased risk for PSMU[18]. Additionally, sensation seeking, internalizing symptoms, social anxiety, loneliness, internet addiction, attention-deficit/hyperactivity disorder (ADHD), low self-esteem, and limited social support have all been identified as significant predictors of PSMU among adolescents[19]. Furthermore, maladaptive cognitions related to social networking were found to mediate the relationship between parental conflict and adolescent PSMU, highlighting the influence of family dynamics and cognitive processing[20].

The negative consequences of PSMU among adolescents have been documented in various empirical studies. PSMU has been associated with increased risk of overweight and obesity, potentially mediated by behavioral factors such as breakfast skipping, reduced physical activity, lower life satisfaction, diminished family communication, and overall health status[21]. Adolescents engaging in PSMU are also more likely to report higher rates of alcohol consumption and smoking, alongside lower engagement in health-promoting behaviors and physical activity[22]. Furthermore, lifestyle habits such as sleep disturbances and reduced physical activity have been identified as mediators in the relationship between PSMU and lower levels of adolescent happiness[23].

3. Research methods

This study employs a quantitative bibliometric approach to analyze scholarly documents related to PSMU indexed in the Scopus database. The analysis was conducted using VOSviewer software, which facilitates the visualization of bibliometric networks. Data were retrieved by executing a structured search query using Boolean operators to ensure relevance to the research topic. The search string applied was: ("problematic social media use" OR "problematic short video use" OR "problematic facebook use" OR "problematic instagram use" OR "problematic tiktok use" OR "problematic whatsapp use" OR "problematic youtube use" OR "instagram overuse" OR "excessive social media use" OR "social media overuse" OR "facebook overuse" OR "instagram overuse" OR "tiktok overuse" OR "short video overuse") AND (adolescen* OR teens* OR youth*). The query targeted the occurrence of these terms in the title, abstract, and author keywords (ABS-TIT-KEY).

Data retrieval was conducted in early November 2024. The filters of the search include: (1) No year restrictions; (2) No document type restrictions; (3) No language restrictions. In general, the absence of specific exclusion filters, such as publication year, language, and document type. This approach was adopted to ensure the inclusion of as many relevant articles as possible that investigate PSMU. The data obtained from the Scopus database were exported in two formats: RIS files for reference management via Zotero and CSV files for bibliometric analysis using VOSviewer. Prior to analysis, the CSV files were processed using OpenRefine to clean the dataset by merging semantically identical terms that appeared with inconsistent

formatting. The classification and normalization of metadata fields are essential procedures in bibliometric research, as emphasized by Waltman and Van Eck[24].

This study employs co-occurrence analysis to identify the developmental trends of themes and research topics within the selected field. To support this analysis, relevant metadata such as article titles, abstracts, author keywords, and indexing information are extracted. The co-occurrence technique enables the visualization of keyword relationships based on their proximity and frequency within the dataset. In the resulting network maps, shorter distances between keywords indicate stronger conceptual associations, while larger visual nodes represent keywords that appear more frequently and are therefore considered dominant research topics[25].

4. Results and discussion

A keyword-based search conducted in the Scopus database yielded a total of 270 articles. The results of this retrieval are presented in the following figures and tables for further analysis and interpretation.

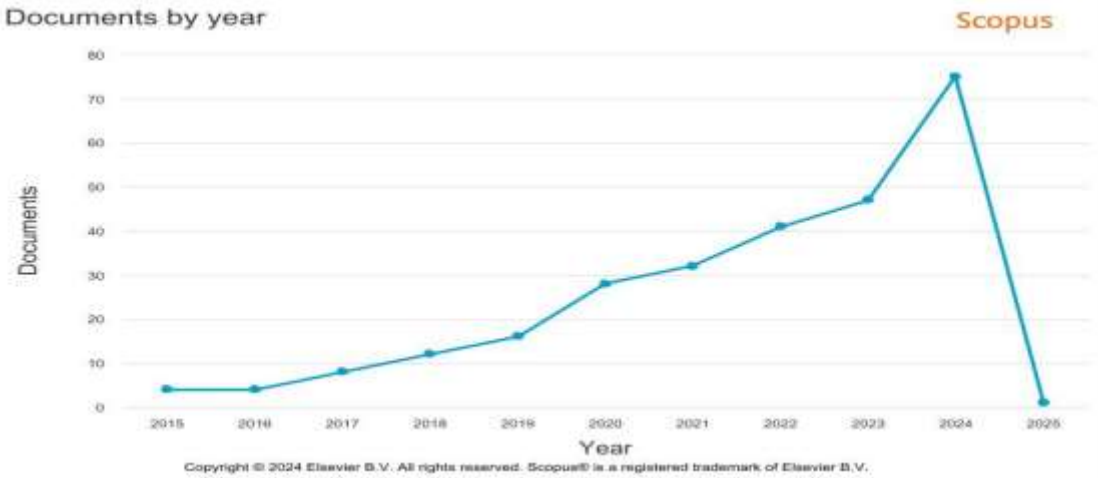

Figure 1. Number of Documents per Year

Figure 1 illustrates a consistent year-over-year increase in research on social media use. Presenting the annual distribution of publications is essential to capturing the temporal evolution and scholarly momentum of the topic, particularly in the context of PSMU. As noted by Donthu et al.[26] bibliometric trend analyses serve as valuable indicators of the maturation of a research field and enable the identification of periods marked by heightened academic interest. Supporting this trend, the *Digital 2023: Global Overview* report from DataReportal in 2023, indicates a steady rise in global social media penetration, reaching 5.22 billion users or 63.8% of the world's population by October 2024. The Internet Service Providers Association in 2024, reported that the global number of social media users increased by 256 million compared to the previous year, representing a growth rate of approximately 5.2%. In Indonesia, this upward trend is similarly evident, with internet penetration rising from 78.19% in 2023 to 79.5% in 2024, indicating an increase of 2.75%.

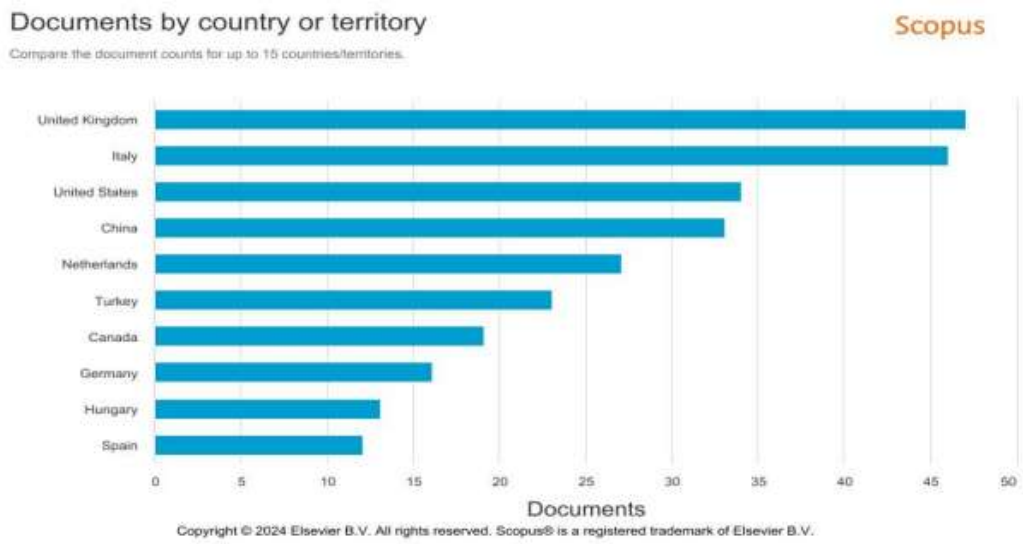

Figure 2. Article trends by country

Notes. *This figure presents only the 10 highest scoring countries*

The distribution of countries contributing to PSMU-related publications may, in part, be influenced by national policies. Socioeconomic status, infrastructure, and policy frameworks related to mental health vary across countries and may shape research productivity in this domain. Notably, policies concerning digital engagement, particularly social media use, have become increasingly relevant within mental health discourse. These contextual factors help explain why certain countries show higher academic output on PSMU, as mental health and digital behavior are now closely monitored policy concerns in many regions[27].

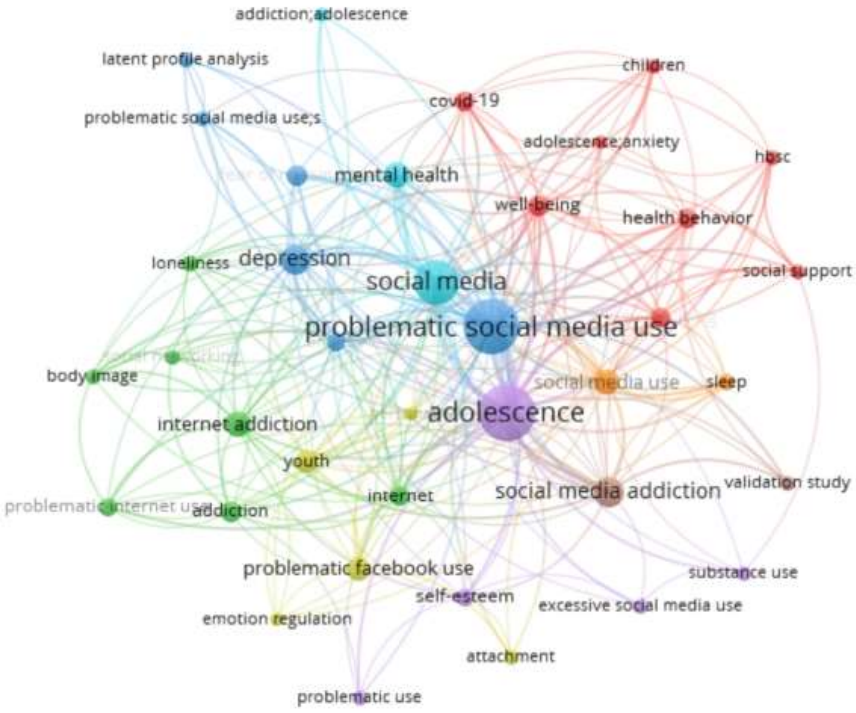

Figure 3. Visualization of co-occurance technique of author keywords analysis unit

Note: *A minimum occurrence threshold of five was applied, resulting in the inclusion of 38 keywords out of a total of 660 in the co-occurrence analysis.*

As shown in **Figure 3**, the size and proximity of the nodes (circles) in the VOSviewer visualization provide insight into the frequency and relational strength of keywords. Larger circles represent topics that appear more frequently across the dataset, whereas smaller circles reflect less frequently studied topics. Additionally, the spatial proximity between keywords indicates the strength of their conceptual association, the closer the distance, the stronger the relationship[25]. In the current visualization, the terms “PSMU” and “adolescence” are represented by the largest circles, which reflects their centrality in the search query. Highly associated keywords "depression", "mental health", "well-being", "health behavior", "social media addiction", and "social support". In contrast, terms such as "loneliness", "body image", "self-esteem", "emotion regulation", "attachment", and "substance use" are present but display weaker associations with PSMU, as indicated by their smaller size and greater distance from the central nodes. Numerous additional topics are not displayed in the visualization due to the minimum threshold setting, which only includes keywords that occurred at least five times.

Table 1. Distribution of author keywords based on co-occurrence analysis

No	Keywords by Author (*Author Keywords*)	Frequency	Relationship Strength
1.	*Problematic social media use*	80	146
2.	*Depression*	24	57
3.	*Social media addiction*	24	57
4.	*Well-being*	12	48
5.	*Social media use*	18	44
6.	*Mental health*	17	40
7.	*Internet addiction*	17	38
8.	*Health behavior*	10	32
9.	*Anxiety*	9	29
10.	*Cyberbullying*	10	26
11.	*Problematic facebook use*	16	24
12.	*Addiction*	13	22
13.	*Sleep*	8	22
14.	*Social support*	6	22
15.	*Body image*	6	19
16.	*Loneliness*	8	18
17.	*Problematic internet use*	9	18
18.	*Self-esteem*	9	17
19.	*Fear of missing out*	12	14
20.	*Social networking*	6	14
21.	*Bullying*	3	15
22.	*Social*		
23.	*Personality*	5	11
24.	*Attachment*	7	9
25.	*Substance use*	6	9
26.	*Emotion regulation*	5	7
27.	*Excessive social media use*	6	7

Notes. *The minimum occurrence limit is 5 keywords.*

As shown in **Table 1,** a total of 27 author keywords met the minimum occurrence threshold of five, representing the strongest co-occurrence relationships within the dataset. The application of this threshold was intended to narrow the analysis to research trends supported by a sufficient empirical base and to emphasize well-established areas of scholarly inquiry. In bibliometric research, the use of such thresholds is a widely accepted practice, as it enhances the robustness, clarity, and interpretability of the resulting network visualizations. Importantly, the determination of a minimum threshold should be contextualized according to the dataset’s size and scope to ensure both analytical rigor and meaningful interpretation of emerging thematic clusters[28]. The keywords most frequently identified by authors primarily relate to mental health

constructs, including *depression*, *anxiety*, and *mental health*. This finding reflects the prominence of literature reviews and meta-analyses that consistently report associations between PSMU and various mental health outcomes.

A meta-analysis conducted by Shannon et al.[29] examined 18 studies and identified consistent associations between PSMU and symptoms of depression, anxiety, and stress. Similarly, Ahmed et al.[30], in a meta-analysis of 98 studies, reported significant positive relationships between PSMU and depression, anxiety, and sleep disturbances. Furthermore, a literature review of 39 articles focusing on predictors of PSMU identified several contributing factors, categorized into four major domains: (1) internet usage patterns (e.g., time spent and frequency), (2) psychological variables (e.g., anxiety, depression, social media communication anxiety, rumination), (3) well-being indicators (e.g., flourishing, life satisfaction, social security, relationship satisfaction, emotional intelligence, self-confidence, self-esteem, vitality, self-liking, psychological capital, and resilience), and (4) fear of missing out[31]. Collectively, these findings highlight PSMU as a salient and growing research focus in the domain of individual mental health

Table 2. Research clusters based on co-occurrence of author keywords

No	Cluster	Author Keywords
1.	Red	*Cyberbullying, health behavior, social support, well-being*
2.	Green	*Addiction, body image, internet addiction, loneliness, problematic internet use, social networking*
3.	Dark blue	*Anxiety, depression, fear of missing out*
4.	Yellow	*Attachment, emotion regulation, personality, problematic facebook use*
5.	Purple	*Excessive social media use, self-esteem, substance use*
6.	Light blue	*Mental health, social media*
7.	Orange	*Sleep, social media use*
8.	Brown	*Social media addiction, validation study*

Notes. *The displayed keywords do not include keywords "PSMU" dan "adolescence"*

Table 2 presents the mapping of research clusters based on keyword co-occurrence analysis, using author keywords with a minimum frequency threshold of five. The resulting clusters reveal a dominance of psychological constructs, particularly those related to mental health. Identifying potential research gaps can be facilitated by examining the co-occurrence patterns of author keywords, especially by exploring conceptual relationships between terms that are not yet fully integrated within the existing literature but show indirect associations with the central topic[32].

The red cluster is supported by findings from a meta-analysis study indicating that problematic internet use (PIU), when measured specifically through PSMU, is more strongly associated with online social support than when measured using general indicators of internet-related problems[33]. Within the green cluster, empirical evidence suggests that body image is positively and directly related to PSMU, but only among adolescent girls[34]. Regarding the construct of loneliness, research has shown that problematic Instagram use is directly associated with anxiety, loneliness, and social anxiety, specifically in male respondents[35]. The dark blue cluster is characterized by studies linking fear of missing out (FoMO) to both general social network use and problematic social networking site use. FoMO demonstrates a strong positive correlation with neuroticism, anxiety, and depression, and a negative correlation with mindfulness[36].

The yellow cluster, which centers on personality-related constructs, is supported by research demonstrating that addressing the Dark Triad personality traits may be effective in reducing PSMU among adolescents[37]. The purple cluster is underpinned by studies emphasizing the importance of considering adolescent problem behaviors such as alcohol and drug use, when examining internet use patterns in this

population[38]. The light blue cluster is informed by meta-analytic findings indicating a positive association between unhappiness and both social media use and media addiction[39]. In support of the orange cluster, a meta-analysis confirmed a significant positive correlation between PSMU and sleep disturbances[30]. Finally, the brown cluster highlights research on social media addiction and instrument validation. A study validating a PSMU measurement tool among Spanish adolescents confirmed its strong psychometric properties[40].

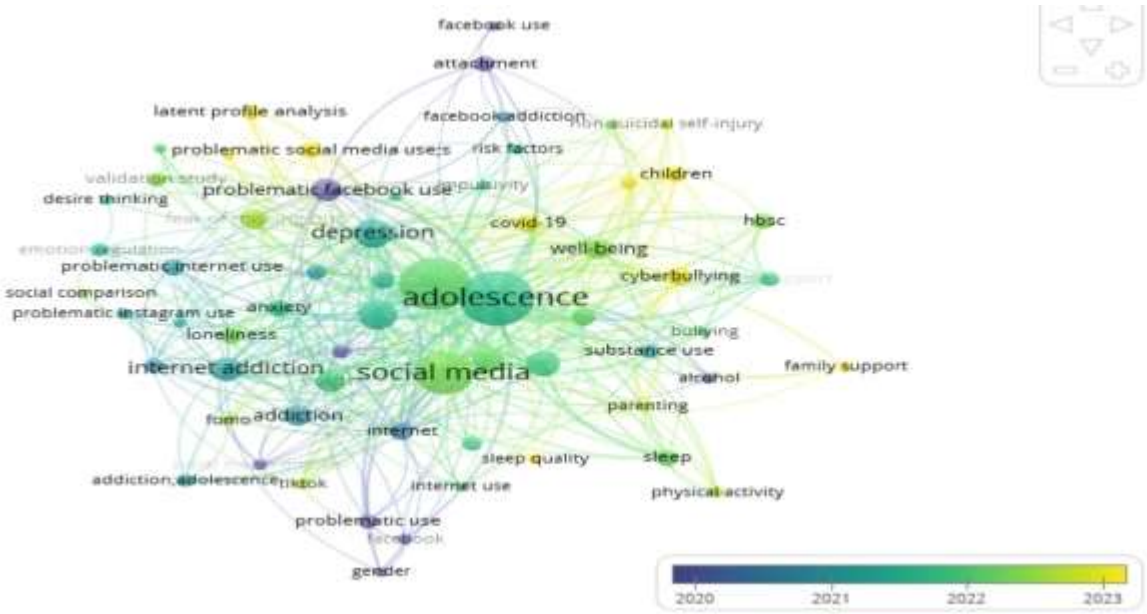

Figure 4. Overlay visualization

Figure 4 presents the results of the overlay visualization, where the color gradient represents the temporal dimension of keyword appearance. Darker colors (e.g., dark green) indicate topics that appeared in earlier publications, whereas lighter colors (e.g., yellow) reflect more recent publications, particularly those from 2023. Several keywords remain among the most recent research trends in the field of PSMU, including "family support", "parenting", "sleep quality", "fear of missing out", "loneliness", “family support”, and "tiktok". This visualization was generated using a minimum keyword occurrence threshold of five; therefore, keywords that appeared fewer than five times were excluded from the overlay map and are not displayed in **Figure 4**.

Figure 4 is particularly useful for identifying research topics that are either emerging or have been extensively studied over time. Recognizing saturation trends in certain topics can support the development of novel research directions. For example, “family support” remains a current topic, as indicated by its lighter (yellow) visualization in the overlay map. Feng et al.[41] demonstrated that high levels of family support can exacerbate the adverse effects of peer victimization on adolescent PSMU through increased psychological insecurity. Similarly, Ledel et al.[42], identified family support as a moderating variable in the relationship between PSMU and self-rated health. These findings suggest that topics represented in brighter colors on the overlay visualization, such as “family support” warrant further exploration to advance theoretical and empirical innovation in the field.

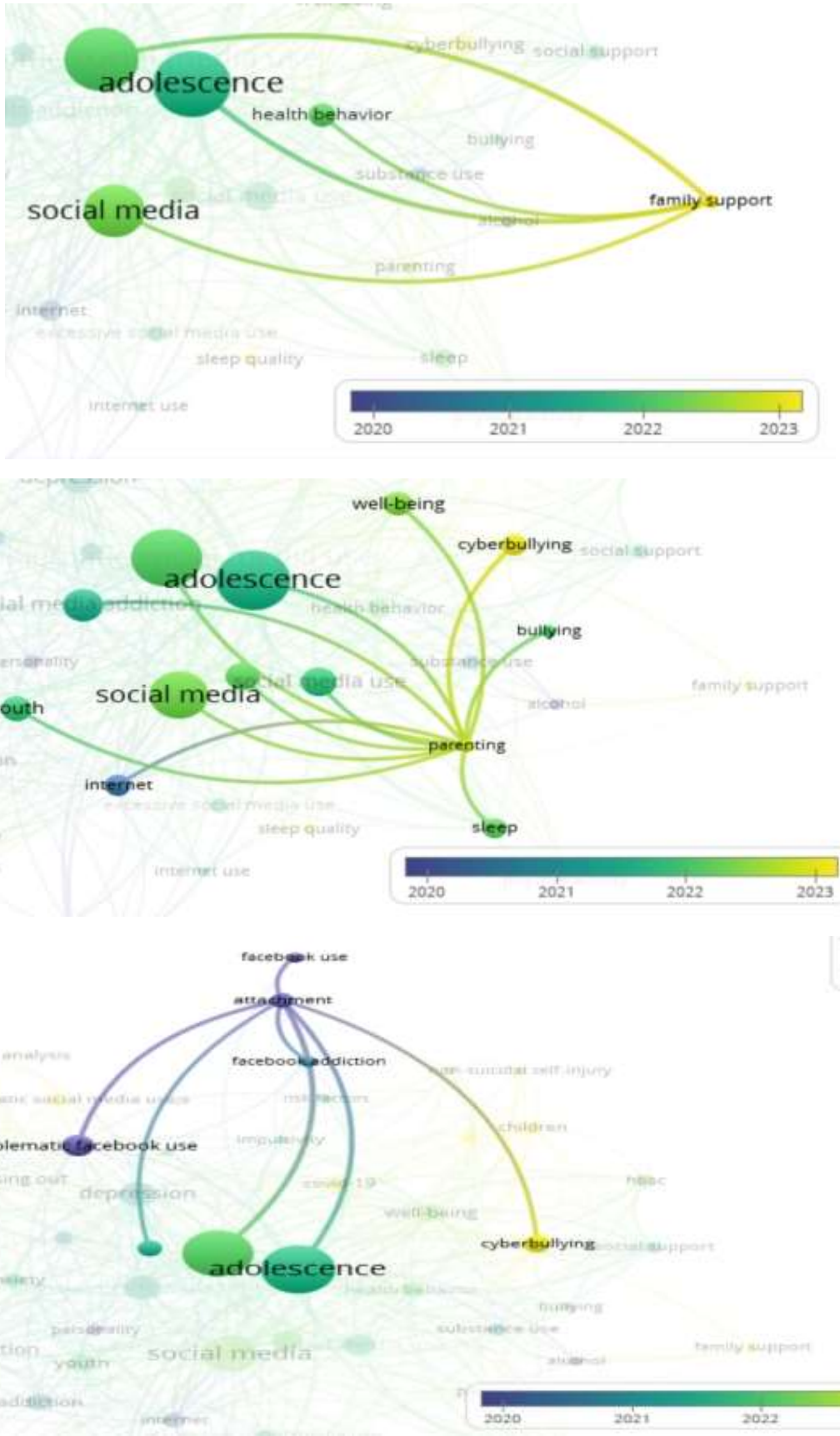

Figure 5. Research clusters related to the family theme

Figure 5 presents an overlay visualization within the thematic context of "family", revealing three distinct patterns. The significance of the family during adolescence is well-established, as it represents a core element of the adolescent's microsystem and plays a foundational role in shaping developmental outcomes. Seidman et al.[43] found that family profiles demonstrated consistent associations with both risk and protective factors related to depression and antisocial behavior. In contrast, peer-related profiles showed more variability depending on the specific developmental outcome being assessed. These findings underscore the importance of considering familial dynamics when examining adolescent psychological and behavioral development.

Overlay visualizations in VOSviewer allow for multifaceted interpretations of bibliometric data. According to Leydesdorff and Rafols[44], research topics are displayed within a scientific landscape, where color gradients represent the temporal dimension of publication. The trajectory of research trends can thus be inferred by examining both the chronological and spatial distribution of keywords across the landscape. In this context, spatial proximity indicates the conceptual closeness between topics, shorter distances reflect stronger associations, while greater distances suggest weaker or emerging connections. In Figure 5, the topic of "family support" appears relatively distant from PSMU, indicating limited co-occurrence and suggesting that it remains an underexplored area. The keyword "parenting" is positioned closer to PSMU and is shaded a lighter yellow, implying more recent attention in the literature. In contrast, "attachment" is represented with a darker color, indicating that it has been studied over a longer period, since around 2019, and maintains moderate proximity to PSMU in the co-occurrence network.

Table 3. Related Factors Peer, Parent, Family, Social, Self

No	Keywords	Specific Related Keywords
1	*"Peer"*	*peer attachment, peer influence, peer pressure and self control, peer support, peer victimization*, *peers,* dan *friend support.*
2.	*"Parent"*	*parental rating, parental attachment, parental mediation, time spent with parent, perceived interparental conflict, parents, digital parental self efficacy, parental rules, parent-child relationship, general parenting, internet-spesific parenting, parental rules, parenting,* dan *parental restrictive mediation,*
3.	*"Family"*	*family affluence, perceived support form family, family support, family life satisfaction, family*, dan *family function.*
4.	*"Social"*	*psychosocial problems, parasocial interaction, social care, social support, comparison social, perssocial norms, social media addiction, social media disorder, preference for online social, social networks, perceived social support, social media disclosure, social rejection, psychosocial well-being, social capital, emotional support from social, social anxiety, social media challenges, social media threat, social connectedness, social inclusion, need for social approval, social withdrawl, psychosocial problems, social media engagament, social media disclosure, social problems, social networks, need for social approval, social media addiction, social presence.*
5.	*"Attachment"*	*parental attachment, peer attachment, attachment anxiety, attachment avoidance*
6.	*"Self"*	*self-control strategies, trait self-control, self-objectification, self-superior narcisissm, self-stigma, self injury, self-esteem, self-harm, self-regulation, selfie-related behaviors, self-control level.*
7.	*"Emotion"*	*Emotion problems, emotional cues, emotional intelligence, emotional support, emotional neglect*
8.	*"Personality"*	*Borderline personality disorder, the dark triad personality, histrionic personality belief, narcissitic personality*
9.	*"Cognitive"*	*Cognitive biases, metacognitions, cognitive distortion, maladaptive cognitive, cognitive ability,*

Table 3 summarizes key psychological topics of "peer", "parent", "family", "social", "attachment", "self", "emotion", "personality", and "cognitive". These topics are categorized based on internal and external psychological factors that may serve as influential variables or contributing factors in the development of PSMU among adolescents

Based on these findings, several policy directions can be proposed for implementation at the school level. For instance, schools may consider developing institutional policies aimed at addressing PSMU. A

relevant study by Throuvala et al.[45] provided policy recommendations derived from interviews with parents regarding the perceived need for school-based interventions. These recommendations included the promotion of media literacy programs during adolescence, extending beyond electronic safety to address issues such as interpersonal communication challenges and the tension between privacy and self-disclosure.

Table 4. Keywords related to research methodology

No	Research method keywords	Frequency	Relationship strength
1	*Major clinical study*	65	1500
2	*Cross sectional study*	51	1178
3	*Controlled study*	85	2009
4	*Survey*	33	807
5	*Psychometrics*	26	597
6	*Correlation*	11	256
7	*Longitudinal study*	10	213
8	*Descriptive research*	7	185
9	*Experiment*	9	181
10	*Longitunal studies*	5	171
11	*Prospective study*	7	164

Table 4 presents the author keywords related to research methods used in studies on PSMU among adolescents. These keywords offer an overview of methodological trends and serve as a reference point for identifying research gaps and informing future study designs. As noted by Gerring[46], the selection of research methods should take into account existing methodological approaches in order to build upon prior findings and address limitations observed in earlier studies.

Although a number of experimental intervention studies targeting PSMU have been conducted, their overall quantity and scope remain limited. Notable interventions include Cognitive Behavioral Therapy (CBT)[47] and Mindfulness-Based Cognitive Behavioral Therapy[48], both of which have shown promise in mitigating problematic behaviors associated with excessive social media use. Additionally, Stinson and Dallery[49] evaluated a multicomponent intervention package comprising contingency management, automated notifications of application usage, and the promotion of alternative offline activities. This approach was effective in reducing participants' daily social media use to target levels or below across all cases examined.

This study has several limitations that should be acknowledged. A primary limitation concerns the exclusive reliance on the Scopus database, which predominantly indexes journals from the Global North. This reliance may introduce systemic biases in both the linguistic and geographical representation of the literature analyzed. As highlighted by Mongeon & Paul-Hus[50], major bibliographic databases such as Scopus tend to overrepresent research outputs from high-income countries particularly those in North America and Western Europe, while underrepresenting scholarly contributions from the Global South. Such disparities in coverage may reduce the visibility of regionally grounded research and lead to partial or skewed interpretations of the global research landscape.

5. Conclusions and suggestions

Based on the results and discussion, several conclusions can be drawn in response to the research questions addressed in this study: 1) Research on PSMU among adolescents has shown a consistent upward

trend over the years; 2) The top ten countries contributing to publications on adolescent PSMU include the United Kingdom, Italy, the United States, China, the Netherlands, Turkey, Canada, Germany, Hungary, and Spain; 3) The most frequently occurring topics based on author keywords include depression, mental health, well-being, healthy behavior, addictive behavior, anxiety, sleep problems, social support, and loneliness, among others. 4). Thematic trends in adolescent PSMU research are associated with both internal psychological factors (e.g., self, emotion, personality, cognition) and external factors (e.g., peer, parent, family, social, attachment); 5) Keywords related to research methodologies commonly found in this domain include clinical study, cross-sectional study, controlled study, survey, and others.

As a suggestion for future research, scholars are encouraged to conduct further literature-based studies, such as scoping reviews and meta-analyses, as well as empirical investigations. In particular, empirical studies employing techniques such as path modeling may offer deeper insights into the relationships between key psychological constructs associated with PSMU. The findings of this study highlight several important directions for future research on PSMU. Thematically, further investigation is warranted in areas such as bullying, personality traits, attachment styles, substance use, and emotion regulation, as these factors may play a role in the onset, development, or maintenance of PSMU. Methodologically, there remains a significant need for experimental research evaluating the effectiveness of targeted therapeutic interventions aimed at reducing PSMU, as well as longitudinal study designs capable of identifying causal pathways and developmental trajectories over time. Furthermore, the current literature is heavily concentrated on adolescent and young adult populations, leaving a considerable gap in empirical knowledge regarding PSMU in children. Given the increasing exposure of younger age groups to digital environments, future studies should prioritize examining the early emergence and potential consequences of PSMU in childhood, employing age-appropriate assessment tools and conceptual frameworks.

Building upon the trends identified in the current body of literature, several practical recommendations can be proposed for policymakers, school administrators, educators, and parents. A key recommendation involves the development of psychoeducational modules aimed at enhancing social media literacy, particularly as it relates to mental health. These modules could address essential topics such as managing fear of missing out (FoMO), training in emotion regulation, fostering healthy peer relationships, and equipping parents with strategies to support adolescents in their digital engagement. Implementing such initiatives may serve as effective preventive measures and promote more adaptive and responsible social media use among youth.

The clusters identified in this study may serve as a foundation for future intervention research. Interventions might include self-development programs, self-regulation training, therapies focused on parent-child relational dynamics, and peer-based interventions. These approaches could be empirically tested to assess their effectiveness in mitigating PSMU among adolescents.

Conflict of interest

The authors declare no conflict of interest

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