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Review

Impact of Problematic TikTok Use on Mental Health: A Systematic Review and Meta-Analysis

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Systematic Review

Impact of Problematic TikTok Use on Mental Health: A Systematic Review and Meta-Analysis

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Abstract: TikTok has rapidly become one of the most popular social media platforms, and, thus, scholars should pay attention to its association with users' mental health. Our aim was to synthesize and evaluate the association between problematic TikTok use and mental health. We applied the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines in our review. The review protocol was registered with PROSPERO (CRD42024582054). We searched PubMed, Scopus, Web of Science, PsycINFO, ProQuest, and CINAHL until September 02, 2024. We identified 16 studies with 15,821 individuals. All studies were cross-sectional and were conducted after 2019. Our meta-analysis showed a statistically significant positive association between TikTok use and depression ($\beta = 0.321$, 95% confidence interval [CI]: 0.261 to 0.381, $p < 0.001$), and anxiety ($\beta = 0.406$, 95% CI: 0.279 to 0.533, $p < 0.001$). Also, we found a positive association between TikTok use and body image issues, poor sleep, anger, distress intolerance, narcissism, and stress. Our findings suggest that problematic TikTok use has a negative impact on several mental health issues. Given the high levels of TikTok use especially among young adults, our findings are essential to further enhance our understanding of the impact of TikTok use on mental health. Finally, there is a need for further studies of better quality to assess the impact of problematic TikTok use on mental health in a more valid way.

Keywords: TikTok; mental health; problematic use; addiction; anxiety; depression; systematic review; meta-analysis

1. Introduction

Approximately, 64% of the total global population are social media users in 2024, while this percentage is predicted to approach 74.4% until 2028. TikTok is one of the fastest growing social media platforms in the world since there were 347 million TikTok users in 2018, 1.4 billion users in 2021, and 2.1 billion users in 2024. Moreover, TikTok users is expected to reach 2.4 billion by the end of 2029. For instance, the number of TikTok users in the USA in 2024 is about 121 million representing the 36.3% of the population. TikTok is particularly popular among adolescents and young adults, since about 64% of TikTok users are between 16 and 29 years old. For instance, 33% of the USA users are younger than 19 years old. There is a slight predominance of the male gender among TikTok users, as the percentage of men is 54.8% and women is 45.2% [1].

TikTok is a social media application that enables users to edit and post short videos with tools provided by the platform such as music, filters, and special effects [2]. Also, TikTok users may interact with original videos. TikTok users may have access to a section with a feed of videos posted by

followers, and a section with a feed of videos posted by strangers which are selected by TikTok artificial intelligence machine according to the user's activity [3]. Since the TikTok artificial intelligence machine is extremely powerful, users are exposed to a large amount of video content that is presumably personally relevant and highly engaging. Therefore, TikTok provides material according to the user's interests, and, thus, it is increasingly attractive [4]. In this context, TikTok users are usually exposed to videos that are posted by users one does not know personally. Thus, TikTok is quite different from other social media applications, such as Facebook, Instagram, and YouTube, and scholars should pay special attention on the impact of this highly popular social media application on users' health.

The association between problematic social media use and mental health is well known since several systematic reviews and meta-analyses have focused on this issue [5–12]. However, no systematic review until now has investigated the association between problematic TikTok use and mental health. Systematic reviews have focused until now on the association between Facebook, Instagram, Twitter, MySpace, Internet, social media in total, and mental health variables. Briefly, the mental health variables that were investigated in systematic reviews included anxiety, depression, psychological distress, wellbeing, life satisfaction, narcissism, eating disorders, and sleep disturbances.

Although several studies [13–16] have examined the impact of problematic TikTok use on mental health there is no systematic review to summarize the evidence on this field. Thus, our aim was to perform a systematic review and meta-analysis to examine the impact of problematic TikTok use on mental health.

2. Materials and Methods

2.1. Data Sources and Strategy

We applied the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [17] to perform our systematic review and meta-analysis. The review protocol was registered with PROSPERO (CRD42024582054).

We searched PubMed, Scopus, Web of Science, PsycINFO, ProQuest, and CINAHL from inception to September 02, 2024. We used the following strategy in all fields: (("problematic use" OR addiction* OR disorder*) AND (TikTok OR "short-form video*" OR "short video*" OR reel*)) AND (anxiety OR depression OR distress OR stress OR loneliness OR self-esteem OR "life satisfaction" OR well-being OR sleep OR "mental health" OR "mental issue*" OR "eating disorder*" OR "emotional disorder*" OR "anxiety disorder*").

2.2. Selection and Eligibility Criteria

First, we removed duplicates and then we screened titles and abstracts. Finally, we screened full texts. Also, we examined the references of all articles included in our review. In particular, two independent authors performed study selection, and a third senior author resolved the discrepancies.

We applied the following inclusion criteria: (a) studies that investigated the association between TikTok use and mental health issues, (b) quantitative studies, (c) studies that included individuals without mental disorders, (d) articles published in English, and (e) articles published in journals with peer review system. We did not apply criteria regarding study population, e.g., gender, age, race, and ethnicity. We excluded studies that investigated any short-form video applications and not specific TikTok. Also, we excluded studies that included patients with a mental disorder such as eating disorder. Moreover, we excluded meeting or conference abstracts, case reports, qualitative studies, reviews, meta-analyses, protocols, editorials, and letters to the Editor.

2.3. Data Extraction

Two scholars independently extracted the following data from each study: first author, year of publication, location, data collection time, sample size, age, percentage of females, study population (adults, university students or school students), study design, sampling method, response rate, scales

for the assessment of TikTok use, mental health variables, scales for the assessment of mental health variables, unstandardized regression coefficients (betas) from linear regression models with mental health variables as the dependent variables, correlation coefficients between TikTok use and mental health variables, other measures of effect (e.g., odds ratio, mean score difference), 95% confidence intervals (CIs) for the measures of effects, p-values, and level of analysis (univariable or multivariable).

2.4. Quality Appraisal

We applied the Joanna Briggs Institute (JBI) critical appraisal tools [18] to assess the quality of studies. Since all studies in our systematic review were cross-sectional, we applied the tool for this type of study. In particular, the JBI tool for cross-sectional studies comprises eight items. In cross-sectional studies, a score of 7-8 points indicates good quality, a score of 4-6 points indicates moderate quality and a score ≤3 indicates poor quality. Two independent reviewers applied the JBI tool in our review, and a third senior author resolved the differences.

2.5. Statistical Analysis

For each study, we extracted measures of effect (e.g., unstandardized regression coefficients, correlation coefficients and odds ratios), standard errors for measures of effect, 95% CIs for measures of effect and p-values. To examine the impact of TikTok use on mental health, we transformed unstandardized regression coefficients and other measures of effect into standardized regression coefficients (β) [19]. Unstandardized regression coefficients may be in different measurement units or scales, and, thus, direct comparison may be meaningless. Also, comparison between different measures of effect is impossible in meta-analysis. Thus, we used standardized regression coefficients to eliminate these problems and combine studies with different measurement units or scales in a more meaningful and straightforward way. Higher absolute values of standardized regression coefficients indicate higher impact of the independent variable on the outcome variable [20].

We calculated the pooled standardized regression coefficient and 95% CI. We measured heterogeneity between studies with the I2 statistics and the p-value for the Hedges Q statistic. I2 values higher than 75% indicates high heterogeneity. Also, a p-value < 0.1 for the Hedges Q statistic indicates statistically significant heterogeneity [21]. The heterogeneity between results was very high, and, thus, we applied the random effects model to calculate the pooled standardized regression coefficient. Among mental health variables sufficient data to perform meta-analysis were available only for depression (six studies) and anxiety (four studies). For all other mental health variables data were available for ≤2 studies; distress (n=2), loneliness (n=2), narcissism (n=1), body image issues (n=1), poor sleep (n=1), life satisfaction (n=1), disordered eating behavior (n=1), anger (n=1), and self-esteem (n=1). We conducted a leave-one-out sensitivity analysis to examine the influence of each study on the pooled standardized regression coefficient. A priori, we considered location, data collection time, sample size, age, percentage of females, population, study design, sampling method, response rate, and quality of studies as possible sources of heterogeneity. Due to the limited variability of these variables and the limited number of studies, we performed meta-regression analysis for data collection time, sample size, age, and percentage of females. Also, we performed subgroup analysis for quality of studies. We used the funnel plot and the Egger's test to assess the publication bias. P-value < 0.05 for Egger's test and asymmetry of funnel plot indicate the presence of publication bias. We used OpenMeta [Analyst] to perform our meta-analysis [22].

3. Results

3.1. Identification and Selection of Studies

After initial search, we found a total of 7484 records. After removal of duplicates, 4087 records were left. Then, we excluded 4053 records through title/abstract screening. We reviewed 34 articles. Applying our inclusion/exclusion criteria, we included 16 articles in our review. Figure 1 shows the flowchart of the literature search according to PRISMA guidelines.
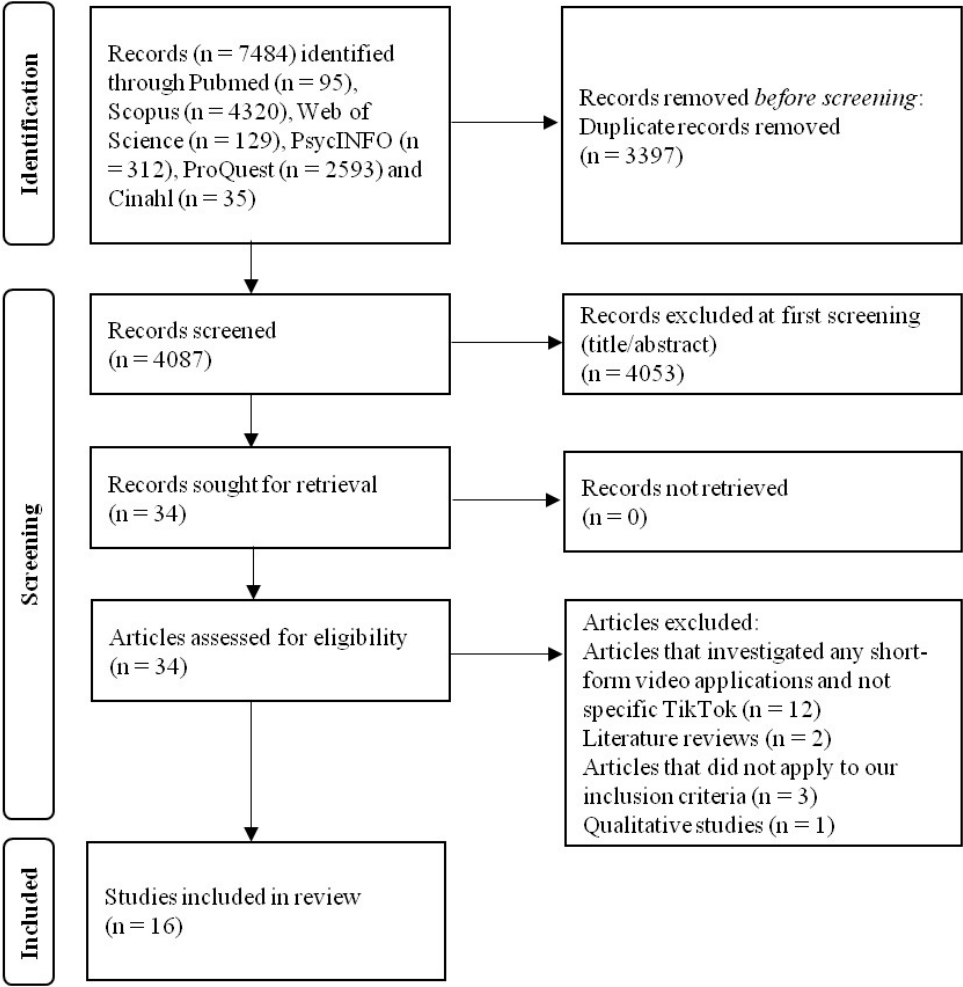
Figure 1. Flowchart of the literature search according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis.

3.2. Characteristics of the Studies

Table 1 presents the main characteristics of the 16 studies included in our systematic review. A total of 15,821 individuals were included in our review with a minimum of 240 participants and a maximum of 5070 participants among studies. Seven studies were conducted in Asia (China [n=3], Pakistan [n=2], Saudi Arabia [n=1], Turkey [n=1]) [13,23–28], four studies in Europe (United Kingdom [n=1], France [n=1], Poland [n=1], Spain [n=1]) [14,15,29,30], three studies in America (USA [n=2], Honduras [n=1]) [16,31,32], one study in Oceania (Australia) [33], and one study in Africa (Nigeria) [34].

One study collected their data in 2019 [32], two studies in 2020 [26,30], one study in 2021 [29], six studies in 2022 [13,15,25,27,28,31], five studies in 2023 [14,16,23,33,34], and one study [24] did not report data collection time.

Eight studies included university students [13,14,16,24,27,31,33,34], three studies included adults [15,28,30], and four studies included school students [23,25,26,32]. Mean age ranged from 14.0 years to 33.8 years. Percentage of females ranged from 42.0% to 100.0%. Females were more in 11 studies, while males were more in one study. All studies were cross-sectional and used a convenience sampling method.

3.3. Measurement Scales for TikTok Use and Mental Health Variables

Table 2 shows the assessment of TikTok use and mental health variables in the studies that included in our review. Seven studies used a valid scale to measure TikTok use [13–16,26–28]. In particular, five studies [13–16,27] used an adapted version of the "Bergen Social Media Addiction

Scale" (BSMAS) by replacing "social media" with "TikTok" throughout the scale. Also, two studies [26,28] used an adapted version of the "Smartphone Addiction Scale-Short Version" (SAS-SV) by replacing "smartphone" with "TikTok" throughout the scale. Nine studies [23–25,29–34] did not use a valid tool to measure TikTok use but they used simple items (e.g., How often do you use TikTok?, Do you use TikTok?).

Studies assessed 13 mental health variables: depression, anxiety, stress, distress intolerance, loneliness, anger, narcissism, self-esteem, body image issues, poor sleep, life satisfaction, disordered eating behavior and disordered eating. Two studies [32,34] did not use valid scales to measure mental health variables. Depression was assessed with the "Patient Health Questionnaire-9" (PHQ-9), the "Center for Epidemiologic Studies Depression Scale" (CES-D scale), and the "Depression Anxiety Stress Scales-21" (DASS-21). Anxiety was assessed with the "Social Interaction Anxiety Scale" (SIAS), the "Generalized Anxiety Disorder-7" (GAD-7), the "State-Trait Anxiety Inventory" (STAI), and the DASS-21. Stress, distress intolerance, loneliness, anger, narcissism, poor sleep, life satisfaction, disordered eating behavior, and disordered eating were assessed with DASS-21, "Distress Intolerance Scale" (DIS), "UCLA Loneliness Scale", "Adolescent Anger Rating Scale" (AARS), "Narcissistic Personality Inventory-16" (NPI-16), "Pittsburgh Sleep Quality Index" (PSQI), "Satisfaction With Life Scale" (SWLS), "Eating Attitudes Test-26" (EAT-26), and "Sick, Control, One, Fat, Food" (SCOFF), respectively.

3.4. Quality Assessment

Supplementary Table 1 shows the quality of the studies included in our review. Quality was moderate in 10 studies [13,23,25,27–33], good in three studies [14–16], and poor in three studies [24,26,34]. The main threats to study quality were the non-valid assessment of TikTok use, and the failure to identify and eliminate confounding factors.

Table 1. Main characteristics of the studies included in this systematic review.

Reference	Location	Data collection time	Sample size (n)	Age, mean (SD)	Females (%)	Population	Study design	Sampling method	Response rate (%)
[28]	China	2022	822	27.5 (5.9)	65.3	Adults	Cross-sectional	Convenience sampling	58.1
[13]	Pakistan	2022	240	18-25 years; 87%, 26-32; 13%	42.0	University students	Cross-sectional	Convenience sampling	NR
[24]	Pakistan	NR	350	NR	NR	University students	Cross-sectional	Convenience sampling	NR
[32]	USA	2019	5070	15.8 (1.2)	54.3	School students	Cross-sectional	Convenience sampling	NR
[14]	United Kingdom	2023	252	19.9 (4.7)	NR	University students	Cross-sectional	Convenience sampling	NA
[23]	Saudi Arabia	2023	961	16.7 (2.1)	59.3	School students	Cross-sectional	Convenience sampling	NR
[30]	France	2020	793	33.8 (14.7)	77.3	Adults	Cross-sectional	Convenience sampling	79.0
[31]	Honduras	2022	412	22.2 (4.4)	65.3	University students	Cross-sectional	Convenience sampling	NR

[33]	Australia	2023	273	NR	100	University students	Cross-sectional	Convenience sampling	NA
[15]	Poland	2022	448	24.5 (3.8)	52.2	Adults	Cross-sectional	Convenience sampling	NA
[27]	China	2022	420	19.6 (1.0)	NR	University students	Cross-sectional	Convenience sampling	NR
[29]	Spain	2021	653	14.0 (1.6)	56.0	School students	Cross-sectional	Convenience sampling	NR
[16]	USA	2023	601	20.0 (1.6)	65.7	University students	Cross-sectional	Convenience sampling	NA
[26]	China	2020	3036	16.6 (0.6)	57.0	School students	Cross-sectional	Convenience sampling	NR
[25]	Turkey	2022	1176	15.6 (1.3)	58.4	School students	Cross-sectional	Convenience sampling	NR
[34]	Nigeria	2023	314	NR	NR	University students	Cross-sectional	Convenience sampling	56.4

NA: not applicable; NR: not reported.

Table 2. Assessment of TikTok use and mental health variables in the studies that included in this systematic review.

Reference	Valid scale for the assessment of TikTok use	Assessment of TikTok use	Mental health variables	Valid scale for the assessment of mental health variables	Assessment of mental health variables
[28]	Yes	SAS-SV (adapted version)a	Depression Social anxiety Distress intolerance	Yes Yes Yes	PHQ-9 SIAS DIS
[13]	Yes	BSMAS (adapted version)b	Depression Anxiety	Yes No	CES-D scale Twenty items
[24]	No	Six items (e.g., I feel irritated, because I feel too responsible for my TikTok-friends fun)	Narcissism	Yes	NPI-16
[32]	No	One item (Do you use TikTok?)	Body image issues	No	One item (Do you have body image issues?)
[14]	Yes	BSMAS (adapted version)b	Depression Loneliness	Yes Yes	CES-D scale UCLA Loneliness Scale
[23]	No	One item (Do you use TikTok?)	Poor sleep	Yes	PSQI
[30]	No	One item (Do you use TikTok?)	Life satisfaction	Yes	SWLS
[31]	No	One item (Do you use TikTok?)	Depression Anxiety	Yes Yes	PHQ-9 GAD-7
[33]	No	One item (How often do you use TikTok?)	Disordered eating behaviour	Yes	EAT-26

[15]	Yes	BSMAS (adapted version)b	Depression	Yes	PHQ-9
[27]	Yes	BSMAS (adapted version)b	Anxiety	Yes	STAI
[29]	No	One item (How often do you use TikTok?)	Disordered eating	Yes	SCOFF
[16]	Yes	BSMAS (adapted version)b	Depression Loneliness	Yes	PHQ-9 UCLA Loneliness Scale
[26]	Yes	SAS-SV (adapted version)a	Depression Anxiety Stress	Yes Yes Yes	DASS-21 DASS-21 DASS-21
[25]	No	One item (Do you use TikTok?)	Loneliness Anger	Yes Yes	UCLA Loneliness Scale AARS
[34]	No	One item (How often do you use TikTok?)	Self-esteem	No	One item (How self-esteem do you feel?)

AARS: Adolescent Anger Rating Scale; BSMAS: Bergen Social Media Addiction Scale; CES-D scale: Center for Epidemiologic Studies Depression Scale; DASS-21: Depression Anxiety Stress Scales-21; DIS: Distress Intolerance Scale; EAT-26: Eating Attitudes Test-26; GAD-7: Generalized Anxiety Disorder-7; NPI-16: Narcissistic Personality Inventory-16; PHQ-9: Patient Health Questionnaire-9; PSQI: Pittsburgh Sleep Quality Index; SAS-SV: Smartphone Addiction Scale-Short Version; SCOFF: Sick, Control, One, Fat, Food questionnaire; SIAS: Social Interaction Anxiety Scale; STAI: State-Trait Anxiety Inventory; SWLS: Satisfaction With Life Scale. [a] Authors replaced "smartphone" with "TikTok" throughout the scale. [b] Authors replaced "social media" with "TikTok" throughout the scale.

3.5. Meta-Analysis

3.5.1. Depression

We calculated the standardized regression coefficients from unstandardized regression coefficients and other measures of effect referring to the relationship between TikTok use and depression. In particular, we calculated standardized regression coefficients from data in six studies [13–16,26,28]. We found a statistically significant positive association between TikTok use and depression since the pooled standardized regression coefficient was 0.321 (95% CI: 0.261 to 0.381, $p < 0.001$) (Figure 2). Heterogeneity between results was high (I^2 = 78.0%, p-value for the Hedges Q statistic < 0.001). A leave-one-out sensitivity analysis showed that no single study had a disproportional effect on the pooled standardized regression coefficient, which varied between 0.302 (95% CI: 0.247 to 0.356, $p < 0.001$), with Yao et al. (2023) excluded, and 0.338 (95% CI: 0.275 to 0.401, $p < 0.001$), with Hendrikse & Limniou (2024) excluded (Supplementary Figure S1). P-value for Egger's test (0.97) and symmetry of funnel plot (Supplementary Figure S2) indicated absence of publication bias.

Meta-regression analysis showed that increased age was associated with increased pooled standardized regression coefficient (beta = 0.012, $p < 0.001$). Moreover, the pooled standardized regression coefficient was independent of data collection time (beta = 0.006, $p = 0.76$), sample size (beta = −0.001, $p = 0.25$), and percentage of females (beta = −0.001, $p = 0.77$).

Subgroup analysis showed that the positive association between TikTok use and depression was stronger among studies with a moderate and high risk of bias (pooled β = 0.34, 95% CI: 0.24 to 0.44, I^2 = 87.6%) than studies with a low risk of bias (pooled β = 0.29, 95% CI: 0.21 to 0.39, I^2 = 69.6%).
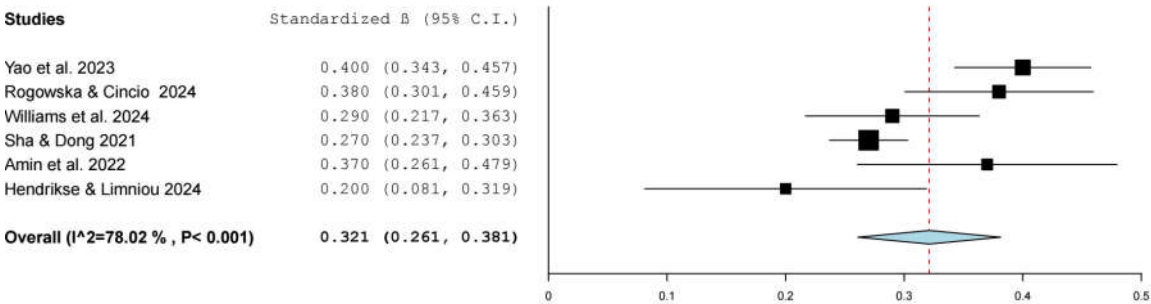
Figure 2. Forest plot of the association between TikTok use and depression.

3.5.2. Anxiety

We calculated the standardized regression coefficients from unstandardized regression coefficients and other measures of effect referring to the relationship between TikTok use and anxiety. In particular, we calculated standardized regression coefficients from data in four studies [13,26–28].

We found a statistically significant positive association between TikTok use and anxiety since the pooled standardized regression coefficient was 0.406 (95% CI: 0.279 to 0.533, p < 0.001) (Figure 3). Heterogeneity between results was high (I^2 = 94.8%, p-value for the Hedges Q statistic < 0.001). A leave-one-out sensitivity analysis showed that no single study had a disproportional effect on the pooled standardized regression coefficient, which varied between 0.350 (95% CI: 0.275 to 0.424, p < 0.001), with Yang et al. (2023) excluded, and 0.445 (95% CI: 0.297 to 0.593, p < 0.001), with Amin et al. (2022) excluded (Supplementary Figure S3). P-value for Egger's test (0.96) and symmetry of funnel plot (Supplementary Figure S4) indicated absence of publication bias.

Meta-regression analysis showed that the pooled standardized regression coefficient was stronger for studies carried out more recently (beta = 0.095, p = 0.040). Also, meta-regression showed that increased percentage of females was associated with increased pooled standardized regression coefficient (beta = 0.008, p = 0.005). Moreover, the pooled standardized regression coefficient was independent of age (beta = 0.003, p = 0.84) and sample size (beta = −0.001, p = 0.42).

We cannot perform subgroup analysis with quality of studies as a potential source of heterogeneity since three studies had a moderate risk of bias, and one study had a high risk of bias.
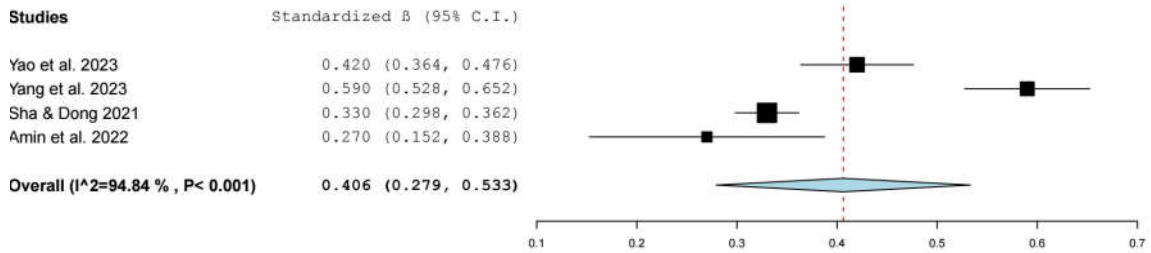

Figure 3. Forest plot of the association between TikTok use and anxiety.

3.5.3. Other Mental Health Variables

Data to perform meta-analysis with the other mental health variables were limited, and, thus, we present findings in a descriptive way. Thus, Williams et al. (2024) found a positive association between TikTok use and loneliness, but Hendrikse & Limniou (2024) and Sarman & Tuncay (2023) did not find a statistically significant relationship. Moreover, our review suggested a positive association between TikTok use and body image issues, poor sleep, anger, self-esteem, distress intolerance, narcissism, and stress [23,24,26,28,32,34]. On the other hand, our findings suggested that there is no relationship between TikTok use and disordered eating behavior, life satisfaction, and disordered eating [29,30,33].

Table 3 shows measures of effect, 95% confidence intervals and p-values between problematic TikTok use and mental health variables.

Table 3. Association between problematic TikTok use and mental health variables.

Reference	Mental health variables	Unstandardized regression coefficient (95% CI, p-value)	Correlation coefficient (p-value)	Other measures of effect	Level of analysis
[28]	Depression		0.40 (<0.01)		Univariable
	Social anxiety		0.42 (<0.01)		
	Distress intolerance		0.46 (<0.01)		
[13]	Depression	0.37 (NR, 0.03)			Univariable
	Anxiety	0.27 (NR, 0.01)			
[24]	Narcissism		0.49 (<0.01)		Univariable
[32]	Body image issues			2.01 (1.74 to 2.31, <0.001)a	Multivariable
[14]	Depression	0.20 (NR, 0.001)			Multivariable
	Loneliness	NR (NR, 0.55)			
[23]	Poor sleep			1.33 (1.01 to 1.77, 0.049)a	Multivariable
[30]	Life satisfaction	-0.04 (NR, >0.05)			Univariable
[31]	Depression			1.85 (<0.01)b	Univariable
	Anxiety			1.99 (<0.001)b	
[33]	Disordered eating behaviour			0.01 (0.31)c	Univariable
[15]	Depression	0.26 (0.16 to 0.37, <0.001)	0.38 (<0.001)		Multivariable
[27]	Anxiety		0.59 (NR)		Univariable
[29]	Disordered eating		0.04 (0.19)		Univariable
[16]	Depression	0.28 (0.19 to 0.37, <0.001)	0.29 (<0.01)		Multivariable
	Loneliness	0.46 (0.31 to 0.60, <0.001)	0.26 (<0.01)		
[26]	Depression		0.27 (<0.01)		Univariable
	Anxiety		0.33 (<0.01)		
	Stress		0.33 (<0.01)		
[25]	Loneliness			-0.4 (0.36)b	Univariable
	Anger			2.2 (0.03)b	
[34]	Self-esteem	0.33 (NR, <0.001)			Univariable

CI: confidence interval; NR: not reported. [a] odds ratio (95% CI, p-value). [b] mean score difference on scale between TikTok users and non-users (p-value). [c] eta squared (p-value).

4. Discussion

To the best of our knowledge, this is the first systematic review and meta-analysis that summarize the research on the impact of problematic TikTok use on mental health. We found that problematic TikTok use has a negative impact on mental health of individuals. In particular, the main findings of our meta-analysis showed that problematic TikTok use has a negative impact on depression and anxiety. Moreover, problematic TikTok use was positively associated with other mental health variables (i.e., body image issues, poor sleep, anger, distress intolerance, narcissism, and stress) but the number of studies was very limited, and, thus, we cannot perform a meta-analysis.

Our meta-analysis identified a positive association between problematic TikTok use and depression. Literature confirms our findings since a recent meta-analysis included eight studies and 6041 individuals found a positive correlation between problematic Facebook use and depression (pooled correlation coefficient = 0.35, 95% CI = 0.30 to 0.41, p-value < 0.001) [10]. Another recent meta-analysis included 18 studies and 9269 adolescents and young adults found similar results since the pooled correlation coefficient between problematic social media use and depression was 0.27 (95% CI = 0.21 to 0.33, p-value < 0.001) [11]. Similarly, a systematic review found a positive correlation

between online social networking and depression with correlation coefficients ranged between 0.15 and 0.26 among studies [8]. Another recent systematic review included 15 studies that have been conducted only in the Middle East and North Africa region found a significant correlation between problematic social media use and symptoms of depression since the correlation coefficients ranged between 0.13 and 0.45 [5].

Similarly, we found the negative impact of problematic TikTok use on anxiety. Literature is in accordance with our findings since a recent meta-analysis found that problematic social media use and anxiety were positively correlated (pooled correlation coefficient = 0.34, 95% CI = 0.30 to 0.37, p-value < 0.001) [12]. Authors utilized data from 56 studies worldwide including 59,928 adolescents and adults. Shannon et al. (2022) also performed a meta-analysis to investigate the relationship between problematic social media use and anxiety and confirmed the results by Wu et al. (2024) since they found a statistically significant correlation (pooled correlation coefficient = 0.35, 95% CI = 0.27 to 0.43, p-value < 0.001) from a pool of nine studies with 5932 adolescents and adults. Marino et al. (2018) found similar results in their meta-analysis since the pooled correlation coefficient between problematic Facebook use and anxiety was 0.33 (95% CI = 0.29 to 0.37, p-value < 0.001). Moreover, Abbouyi et al. (2024) performed a systematic review of studies only in the Middle East and North Africa region and found that the correlation coefficients between problematic social media use and anxiety ranged between 0.17 and 0.39.

Although the number of studies to perform meta-analysis with other mental health variables was limited, our review suggests the negative association between problematic TikTok use and body image issues, poor sleep, anger, distress intolerance, narcissism, and stress. Several systematic reviews and meta-analyses support our findings. In particular, a recent meta-analysis included six studies with 3541 participants and found that the pooled correlation coefficient between problematic social media use and stress was 0.31 (95% CI = 0.20 to 0.42, p-value < 0.001) [11]. Another meta-analysis identified the positive association between problematic Facebook use and psychological distress among 9172 adolescents and young adults (pooled correlation coefficient = 0.29, 95% CI = 0.24 to 0.34, p-value < 0.001) [10]. A recent systematic review found a positive correlation between problematic social media use and poor sleep quality, and a negative correlation between problematic social media use and sleep duration [7]. Another systematic review revealed a positive correlation between problematic Facebook use and narcissism with correlation coefficients ranged between 0.13 and 0.32 in six studies [9]. Two systematic reviews showed the negative impact of social media on body image issues [35,36]. In particular, Mironica et al. (2024) reviewed 25 studies with 13,731 participants and found a link between social media's emphasis on visual aesthetics, and social appearance anxiety, body dissatisfaction and beauty perception. Additionally, Vincente-Benito & Ramírez-Durán (2023) revealed the association between misuse or intensive social media use and body dissatisfaction and eating disorders.

In our review, we recognize the absence of a scale to specifically measure problematic TikTok use. Most studies used non-valid self-reported items of problematic TikTok use (e.g., "How often do you use TikTok?"), while a few studies used adapted versions of valid scales which are developed to measure problematic social media use in general (e.g., Bergen Social Media Addiction Scale). Recently, a new scale was developed to specifically measure the problematic use of TikTok [37]. In particular, scholars focused their study only on TikTok use and developed the TikTok Addiction Scale (TTAS). Development of the TTAS is based on the addiction six core components, i.e., salience, mood modification, tolerance, withdrawal, conflict and relapse. The TTAS is proven to be a reliable and valid tool in a sample of adults. Further studies should examine the validity of the TTAS in different populations, cultures, settings, and languages. In addition, the use of a specific scale to assess problematic TikTok use will provide more valid conclusions about the impact of TikTok on the mental health of individuals.

Additionally, we found that no study measures the prevalence of problematic use of TikTok. In our review, five studies [13–16,27] used adapted versions of the Bergen Social Media Addiction Scale [38] to measure problematic TikTok use, and two studies [26,28] used adapted versions of the Smartphone Addiction Scale-Short Version [39]. Several studies have suggested cut-off points for the

BSMAS [40–42] and the SAS-SV [39,43] to discriminate addicted social media/smartphone users versus non-addicted users, and, thus, estimate the prevalence of social media/smartphone addiction. However, no study so far has classified TikTok users into addicted and non-addicted and therefore has not measured the prevalence of TikTok addiction or problematic TikTok use. Perhaps, the lack of a scale that specifically measures TikTok use may prevent scholars from measuring prevalence of problematic TikTok use or TikTok addiction. As we mentioned above the newly developed TTAS specifically measures TikTok use, and the suggested cut-off point [44] by the developers of the scale may help scholars to identify problematic TikTok users. Early recognition of signs of TikTok addiction in screening level is essential to reduce negative implications and improve users' mental health.

4.1. Limitations

Our study has several limitations. First, data to perform meta-analysis are scarce. In particular, we can perform meta-analysis only for two mental health variables, i.e., depression and anxiety. Subsequently, subgroup analysis is allowed only for some variables. For instance, there are only four studies set in European countries, two studies in the USA, and one study in Australia. Moreover, only one study examined the association between TikTok use and several mental health variables, such as body image issues, poor sleep, anger, distress intolerance, narcissism, and disordered eating. Therefore, we cannot generalize our results since the representativeness of our studies is limited. Scholars should conduct further studies to obtain more valid results. Second, we cannot establish a causal relationship between problematic TikTok use and mental health variables since all studies in our review were cross-sectional. Performing longitudinal studies and measuring TikTok use and mental health variables through time will add evidence on this domain. Third, the non-valid measurement of TikTok use in most studies introduces an important information bias. Thus, future studies should use valid tools to measure levels of TikTok use. Fourth, all studies used convenience samples, and, thus, generalization of our findings should be with caution. Further studies should be conducted with random and stratified samples to reduce this selection bias. Fifth, only five out of 16 studies used multivariable models to eliminate confounding factors. Since confounders usually increase the values of measures of effect, future studies should eliminate confounders to get more valid results of the independent effect of TikTok use on mental health variables. Finally, we searched six major databases to conduct our review by applying an extended search strategy. Although we applied the PRISMA guidelines, it is still possible that we have failed to include a relevant study in our review. For instance, we searched for studies only in English language.

5. Conclusions

Although the number of studies is limited and their quality is mainly moderate/poor, our work suggests the possible harms of problematic TikTok use. Our meta-analysis provides evidence for the negative effect of problematic TikTok use on depression and anxiety. However, since our review and meta-analysis suffer from several limitations, there is a need for further studies to establish the relationship between problematic TikTok use and mental health. Our review identified only cross-sectional studies, and, thus, scholars should conduct longitudinal studies to extract more solid results. TikTok use is constantly increasing, and extra care is needed to avoid its negative effects. Moreover, since the nature and functionality of TikTok may change through time, our findings about the relationship between problematic TikTok use and mental health need further empirical consideration. Therefore, scholars should perform studies with a more robust conceptualization and measurement of problematic TikTok use to improve our understanding of this evolving field.

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