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Association Between TikTok Use and Anxiety, Depression, and Sleepiness Among Adolescents: A Cross-Sectional Study in Greece

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Association Between TikTok Use and Anxiety, Depression, and Sleepiness Among Adolescents: A Cross-Sectional Study in Greece

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Abstract: TikTok use is increasing especially among children and adolescents. However, the negative effects of TikTok use have not been sufficiently investigated. Thus, the aim of our study was to examine the association between TikTok use and anxiety, depression, and sleepiness in adolescents. We conducted a web-based cross-sectional study in Greece. We employed a convenience sample of adolescents in Greece. We used the TikTok Addiction Scale (TTAS) to measure TikTok use, and the Patient Health Questionnaire-4 (PHQ-4) to measure anxiety and depression. We constructed multivariable regression models, and we performed stratified analysis according to gender. Mean daily TikTok usage and TTAS score was statistically higher for girls than boys. Our multivariable analysis showed that the problematic TikTok use was associated with higher levels of anxiety and depression symptoms in both genders. Additionally, we found that the impact of TikTok on anxiety and depression was higher among boys than girls. We found that problematic TikTok use was associated with increased sleepiness in both genders. Our findings showed the positive association between TikTok use and anxiety, depression, and sleepiness. Considering our study limitations and the limited number of studies on this field, future studies are necessary to produce more valid results.

Keywords: TikTok; anxiety; depression; sleepiness; adolescents; problematic use; TikTok Addiction Scale

1. Introduction

In the digital age, social media platforms have become essential in shaping human behavior and interacting with others. Among these platforms, TikTok has become a favorite among teenagers and young adults with over 1 billion users worldwide. Approximately, 35% of TikTok users are between 16 and 24 years old [1]. TikTok is a short-form video-sharing app that allows users to consume and make short videos between 15-60 seconds in length, using filters, music and lip-syncing templates. TikTok videos are algorithm-driven and tailored to users' indicated preferences and previously liked content [2]. Thus, the immersive design of TikTok may cause compulsive use especially among adolescents since they are particularly vulnerable to the effects of social media, because adolescence is a critical developmental period with intense physical, emotional and social changes [3].

Several systematic reviews showed the negative influence of Facebook, Instagram and Twitter (X) or social media in total, without including TikTok measurement, on adolescents' mental health [3–5]. For instance, Keles et al. found that time spent on social media, social media activity, investment, and addiction were correlated with psychological distress, anxiety, and depression [4].

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Similarly, Saleem et al. identified 67 studies and showed a positive relationship between problematic social media use and anxiety and depression [5]. Moreover, Kerr et al. included 32 studies in their systematic review and found a positive association between problematic social media use and anxiety symptoms [3].

Although the association between problematic Facebook, Instagram and Twitter (X) use and mental health issues among adolescents is well established, there is little known regarding the association between TikTok use and anxiety, depression, and sleepiness among adolescents. To the best of our knowledge, there are only four studies that examined the association between TikTok use and anxiety, depression, and sleep quality among adolescents [6–9]. In particular, two studies examined the association between TikTok use and anxiety symptoms [6,8], four studies investigated the association between TikTok use and depressive symptoms [6–9], and one study explored the association between TikTok use and sleep quality [6]. Chao et al. examined 1346 adolescents (mean age; 14.5 years) in China and found that TikTok addictive users show worse mental health conditions, such as greater levels of stress, anxiety, sadness, loneliness, social anxiety, focus issues, and poorer sleep and life satisfaction compared to non-users and moderate users. Additionally, TikTok addictive users experienced inferior academic performance, more bullying victimization, worse family connections, and higher academic stress [6]. Sha & Dong included in their study 3036 Chinese students with a mean age of 16.7 years and found a positive relationship between TikTok use disorder and anxiety, depression, and stress [8]. Also, Gentzler et al. employed a sample of 237 American adolescents (mean age; 15.1 years) and found a positive relationship between total time spent on TikTok and depressive symptoms [7]. Ilic-Zivojinovic et al. investigated 620 students (mean age; 16.1 years) in Serbia and found that depressive symptoms are more frequent among TikTok users than non users [9]. We should notice that Gentzler et al. [7] measured only total time spent on TikTok without using a valid scale to measure levels of TikTok use. Also, Ilic-Zivojinovic et al. did not even measure frequency of TikTok use but they divided their participants to TikTok users and non users with a yes/no question. Moreover, Chao et al. [6] and Sha & Dong [8] used a valid scale to measure TikTok use (i.e., Smartphone Addiction Scale (SAS) [10]), but the SAS is not a specific scale to measure TikTok use since it has been constructed to measure smartphone addiction among user. Chao et al. [6] and Sha & Dong [8] used the SAS by changing the word “smartphone” with the word “TikTok” throughout the scale.

Several other studies showed the negative association between TikTok use and mental health issues among adolescents other than anxiety, depression, and sleep quality. In brief, literature suggests the negative impact of TikTok on self-body image, satisfaction of physical appearance, eating disorders, social isolation, unhappiness, self-esteem, concentration, time distortion, anger [11–19]. All these studies measured only total time spent on TikTok without using a valid scale.

In this context, we performed a study to explore the association between TikTok use and anxiety, depression, and sleepiness in adolescents since the literature on this field is scarce. We investigated this association for first time in a European country, i.e., Greece. Moreover, to the best of our knowledge this is the first study that used a valid scale to measure problematic TikTok use, namely the TikTok Addiction Scale.

2. Materials and Methods

2.1. Study Design

World Health Organization defines adolescence as the phase of life between childhood and adulthood, from ages 10 to 19 [20]. In this context, we conducted a cross-sectional study in Greece including adolescents aged 18 and 19 years old. We developed an online version of the study questionnaire using Google forms and we disseminated it through TikTok. In particular, we created a TikTok video that informs TikTok users about our study. Users that want to participate in our study should be students aged 18 and 19 years old. Moreover, our participants should understand the Greek language. We sent the Google form link to TikTok users that want to participate in our study

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through an inbox message. Thus, we obtained a convenience sample. We collected our data during December 2024.

We used G*Power v.3.1.9.2 to calculate our sample size. Considering a small effect size between TikTok problematic use and anxiety, depression, and sleepiness ($f^2 = 0.07$), the number of independent variables (six predictors and one confounder), a confidence level of 95%, and a margin error of 5%, sample size was estimated at 188 participants.

2.2. Measurements

We measured gender and age of our participants. Sleepiness was measured with a single item, i.e., "How sleepy do you feel in class?". Answers are on 10-point Likert scale from 1 (not sleepy at all) to 10 (very sleepy).

We measured TikTok problematic use with the Greek version of the TikTok Addiction Scale (TTAS) [21]. The TTAS includes 15 items and measures six factors: salience (two items), mood modification (two items), tolerance (three items), withdrawal symptoms (two items), conflict (four items), and relapse (two items). Answers are on a five-point Likert scale from 1 (very rarely) to 5 (very often). Total score and scores on factors range from 1 to 5. Higher score indicates higher levels of TikTok problematic use. There is a suggested cut-off point score of 3.23 to distinguish healthy users from problematic TikTok users [22]. In our study, Cronbach's alpha for the TTAS was 0.905, while Cronbach's alpha for the six factors ranged from 0.652 to 0.869.

We measured anxiety and depression with the Patient Health Questionnaire-4 (PHQ-4) [23]. The PHQ-4 includes four items and measures anxiety (two items) and depression (two items). Answers are on a four-point Likert scale from 0 (not at all) to 3 (nearly every day). Scores on two factors range from 0 to 6 with higher scores indicating higher levels of anxiety and depressive symptoms. Scores of 3 or greater are positive for screening purposes. We used the Greek version of the PHQ-4 [24]. In our study, Cronbach's alpha for the PHQ-4 was 0.803, for the anxiety was 0.823, and for the depression was 0.704.

2.3. Ethical Issues

Our study protocol was approved by the Ethics Committee of the Faculty of Nursing, National and Kapodistrian University of Athens (approval number; 510, June 2024). Moreover, we followed the guidelines of the Declaration of Helsinki to perform our study [25]. We informed our participants about the study design, and we asked whether they consent to participate in our study. In that way, we obtained informed consent. Participants with a positive answer can further fill in the study questionnaire.

2.4. Statistical Analysis

We present categorical variables with numbers and percentages. Additionally, we present continuous variables with mean, standard deviation (SD), median, minimum value and maximum value. We considered the six factors of the TTAS as the independent variables. However, tolerance and variance inflation factor indices for factors "salience", "tolerance" and "withdrawal" had unacceptable values (tolerance lower than 0.5 and variance inflation factor higher than 4) [26]. Therefore, to avoid multicollinearity issues in the multivariable regression models we had to remove three factors (i.e., salience, tolerance and withdrawal) from the final models. We considered anxiety score, depression score and sleepiness as dependent variables. Since dependent variables are continuous variables that followed normal distribution, we applied the linear regression analysis. In that case, we present unadjusted and adjusted coefficients beta, 95% confidence intervals (CI), and p-values. We adjusted all models for age. We performed a stratified analysis according to gender to identify possible differences between girls and boys. We compared daily TikTok usage and TTAS score by two genders with independent samples t-test. Also, we used chi-square test to compare percentage of TikTok problematic use among the two genders. P-values less than 0.05 were

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considered as statistically significant. We used the IBM SPSS 28.0 (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp) for the analysis.

3. Results

3.1. Demographic Characteristics

Study population included 219 participants. Most of them were girls (81.3%, n=178), while 18.7% (n=41) were boys. Moreover, 51.1% (n=112) were 19 years old and 48.9% (n=107) were 18 years old. Mean sleepiness score was 5.84 (SD; 2.09) with a median value of 6 (range; 0 to 10).

3.2. TikTok Use

The mean daily TikTok usage was 2.77 hours (SD; 1.79), with a median of 2 hours (range; 0.1 to 8). Mean daily TikTok usage was statistically higher for girls than boys (2.87 vs. 2.32, p-value = 0.023). The mean TTAS score was 2.48 (SD; 0.69), and the median score was also 2.47 (range; 1.07 to 4.07). Mean TTAS score was statistically higher for girls than boys (2.53 vs. 2.27, p-value = 0.019). Table 1 presents descriptive statistics for TTAS. The factors "mood modification" and "tolerance" had the highest mean scores, followed by "conflict" and "salience". The factors "relapse" and "withdrawal symptoms" showed the lowest mean scores. Among the participants, 16.9% (n=37) had a mean score ≥ 3.23, indicating problematic TikTok use, while 83.1% had a mean score < 3.23, suggesting healthy usage patterns. Prevalence of TikTok problematic use was higher among girls (19.1%, n=34) vs. boys (7.3%, n=3) but the difference was not statistically significant (p-value = 0.07).

Table 1. Descriptive statistics for the TikTok Addiction Scale.

	Mean	Standard deviation	Median	Minimum value	Maximum value
TikTok Addiction Scale	2.48	0.69	2.47	1.07	4.07
Salience	1.99	0.85	2.00	1.00	4.50
Mood modification	3.64	0.89	3.50	1.00	5.00
Tolerance	3.12	0.99	3.00	1.00	5.00
Withdrawal symptoms	1.45	0.66	1.00	1.00	3.00
Conflict	2.55	1.00	2.50	1.00	5.00
Relapse	1.83	0.96	1.50	1.00	5.00

3.3. Anxiety and Depression

Mean anxiety score was 2.95 (SD; 1.74) with a median value of 3 hours (range; 0 to 6), while mean depression score was 2.11 (SD; 1.57) with a median value of 2 hours (range; 0 to 6). More than half of our participants (55.7%, n=122) had an anxiety score ≥3 indicating considerable anxiety issues. Moreover, 31.5% (n=69) had a depression score of 3 or greater, indicating high levels of depressive symptoms.

3.4. Association Between TikTok Use and Anxiety

Multivariable analysis in full sample showed a positive association between mood modification and anxiety score (adjusted coefficient beta = 0.404, 95% CI = 0.115 to 0.693, p-value = 0.006). Stratified analysis showed that the impact of mood modification on anxiety score was higher among boys (adjusted coefficient beta = 0.760, 95% CI = 0.121 to 1.399, p-value = 0.021) than girls (adjusted coefficient beta = 0.338, 95% CI = 0.031 to 0.645, p-value = 0.031). Moreover, we found a statistically significant and positive association between conflict and anxiety score between boys (adjusted coefficient beta = 1.236, 95% CI = 0.763 to 1.710, p-value < 0.006), but this association did not exist

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among girls. Table 2 shows univariate and multivariable linear regression models with anxiety score as the dependent variable.

Table 2. Linear regression models with anxiety score as the dependent variable.

Independent variables	Univariate models			Multivariable model[a,b]		
	Unadjusted coefficient beta	95% CI for beta	P-value	Adjusted coefficient beta	95% CI for beta	P-value
Full sample[b]						
Mood modification	0.476	0.224 to 0.728	<0.001	0.404	0.115 to 0.693	0.006
Conflict	0.266	0.034 to 0.497	0.025	0.098	-0.168 to 0.365	0.467
Relapse	0.280	0.040 to 0.520	0.023	0.066	-0.220 to 0.351	0.651
Boys[c]						
Mood modification	1.130	0.418 to 1.842	0.003	0.760	0.121 to 1.399	0.021
Conflict	1.392	0.926 to 1.858	<0.001	1.236	0.763 to 1.710	<0.001
Relapse	0.243	-0.524 to 1.010	0.525	-0.063	-0.660 to 0.533	0.831
Girls[d]						
Mood modification	0.365	0.093 to 0.638	0.009	0.338	0.031 to 0.645	0.031
Conflict	0.019	-0.235 to 0.273	0.883	-0.273	-0.581 to 0.034	0.081
Relapse	0.283	0.031 to 0.534	0.028	0.304	-0.013 to 0.621	0.060

[a] Multivariable models are adjusted for age. [b] R^2 for the multivariable model = 4.8%, p-value for ANOVA = 0.006. [c] R^2 for the multivariable model = 18.2%, p-value for ANOVA < 0.001. [d] R^2 for the multivariable model = 4.1%, p-value for ANOVA = 0.023. CI: confidence interval.

3.5. Association Between TikTok Use and Depression

Multivariable analysis in full sample showed a positive association between conflict and depression score (adjusted coefficient beta = 0.472, 95% CI = 0.239 to 0.704, p-value < 0.001). This association remained in both boys and girls. Moreover, stratified analysis showed that the impact of conflict on depression score was higher among boys (adjusted coefficient beta = 1.076, 95% CI = 0.532 to 1.620, p-value < 0.001) than girls (adjusted coefficient beta = 0.361, 95% CI = 0.093 to 0.629, p-value = 0.009). Table 3 shows linear regression analysis with depression score as the dependent variable.

Table 3. Linear regression models with depression score as the dependent variable.

Independent variables	Univariate models			Multivariable model[a,b]		
	Unadjusted coefficient beta	95% CI for beta	P-value	Adjusted coefficient beta	95% CI for beta	P-value
Full sample[b]						
Mood modification	0.296	0.065 to 0.527	0.012	0.051	-0.200 to 0.303	0.688
Conflict	0.542	0.344 to 0.740	<0.001	0.472	0.239 to 0.704	<0.001
Relapse	0.374	0.161 to 0.588	0.001	0.117	-0.132 to 0.366	0.355
Boys[c]						
Mood modification	0.387	-0.358 to 1.131	0.300	-0.245	-0.979 to 0.489	0.503
Conflict	1.011	0.495 to 1.527	<0.001	1.076	0.532 to 1.620	<0.001
Relapse	0.538	-0.168 to 1.244	0.131	0.650	-0.035 to 1.336	0.062
Girls[d]						
Mood modification	0.295	0.052 to 0.538	0.018	0.101	-0.166 to 0.369	0.456
Conflict	0.456	0.241 to 0.672	<0.001	0.361	0.093 to 0.629	0.009
Relapse	0.351	0.130 to 0.572	0.002	0.102	-0.174 to 0.379	0.466

[a] Multivariable models are adjusted for age. [b] R^2 for the multivariable model = 10.9%, p-value for ANOVA < 0.001. [c] R^2 for the multivariable model = 28.2%, p-value for ANOVA = 0.003. [d] R^2 for the multivariable model = 8.0%, p-value for ANOVA = 0.001. CI: confidence interval.

3.6. Association Between TikTok Use and Sleepiness

We found that mood modification (adjusted coefficient beta = 0.655, 95% CI = 0.336 to 0.975, p-value < 0.001) and conflict (adjusted coefficient beta = 0.674, 95% CI = 0.379 to 0.969, p-value < 0.001) were associated with increased sleepiness in full sample. Moreover, we identified a positive association between mood modification and sleepiness in both boys and girls. Also, stratified analysis showed that the impact of mood modification on sleepiness was higher among boys (adjusted

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coefficient beta = 1.030, 95% CI = 0.246 to 1.813, p-value = 0.011) than girls (adjusted coefficient beta = 0.610, 95% CI = 0.255 to 0.965, p-value = 0.001). We found a statistically significant and positive association between conflict and sleepiness between girls (adjusted coefficient beta = 0.675, 95% CI = 0.319 to 1.031, p-value < 0.001), but this association did not exist among boys. Table 4 shows univariate and multivariable linear regression models with sleepiness as the dependent variable.

Table 4. Linear regression models with sleepiness as the dependent variable.

Independent variables	Univariate models			Multivariable model[a,b]		
	Unadjusted coefficient beta	95% CI for beta	P-value	Adjusted coefficient beta	95% CI for beta	P-value
Full sample[b]						
Mood modification	0.818	0.526 to 1.111	<0.001	0.655	0.336 to 0.975	<0.001
Conflict	0.789	0.529 to 1.049	<0.001	0.674	0.379 to 0.969	<0.001
Relapse	0.386	0.098 to 0.673	0.009	-0.217	-0.533 to 0.098	0.176
Boys[c]						
Mood modification	0.981	0.254 to 1.708	0.009	1.030	0.246 to 1.813	0.011
Conflict	0.754	0.160 to 1.348	0.014	0.450	-0.130 to 1.031	0.124
Relapse	-0.117	-0.880 to 0.646	0.759	-0.621	-1.352 to 0.111	0.094
Girls[d]						
Mood modification	0.790	0.462 to 1.118	<0.001	0.610	0.255 to 0.965	0.001
Conflict	0.794	0.498 to 1.089	<0.001	0.675	0.319 to 1.031	<0.001
Relapse	0.457	0.145 to 0.770	0.004	-0.178	-0.545 to 0.189	0.339

[a] Multivariable models are adjusted for age. [b] R^2 for the multivariable model = 19.0%, p-value for ANOVA < 0.001. [c] R^2 for the multivariable model = 25.9%, p-value for ANOVA = 0.005. [d] R^2 for the multivariable model = 18.4%, p-value for ANOVA < 0.001. CI: confidence interval.

4. Discussion

We conducted a cross-sectional study to explore the association between TikTok use and anxiety, depression, and sleepiness in a sample of adolescents in Greece. We used a valid tool that measures specifically problematic TikTok use (i.e., the TikTok Addiction Scale) on contrary with previous studies that measure TikTok use with non-specific tools or even with simple questions that measure only frequency of TikTok use [6–9]. Main findings of our study showed a positive association between TikTok use and anxiety, depression, and sleepiness in adolescents.

In our study, the mean time of daily TikTok use was 2.77 hours. Data show that US adolescents spend 2.5 hours a day on TikTok [1]. Also, Gentzler et al. in a sample of American adolescents found that mean time of daily TikTok use is 2.17 hours [7]. A recent study in China found a higher level of TikTok use with a mean daily time of 2.85 hours [6].

In our sample, mean daily TikTok usage and mean TTAS score were statistically higher for girls than boys. Also, we found that TikTok problematic use was higher among girls vs. boys. Literature supports our findings since Gentzler et al. found that the mean time of daily TikTok use was 2.80 hours and 1.68 hours for girls and boys, respectively, and this difference was statistically significant [7]. Moreover, girls spent more time on smartphones, social media, texting, and general computer use than boys, according to data from three large, representative surveys of adolescents in the US and the UK aged 13 to 18 [27]. Also, Kircaburun et al. employed a sample of university students in Turkey and found that women are more prone to be problematic social media users, meaning they have a harder time controlling how much time they spend on social media [28]. This difference between the two genders may be attributed to the fact that girls place greater importance on social relationships than boys [29–31]. Given that social connections play a more significant role in the well-being of girls, their engagement with social media platforms may have a stronger link to their mental health. Additional factors at the intersection of gender and adolescent development could also be at play. For instance, social media might trigger feelings of upward social comparison [32], a process that could be particularly influential among female adolescents [33]. Furthermore, the heightened body image concerns experienced by girls may be intensified by their exposure to social media content [34].

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Our analysis revealed that the factors "mood modification" and "tolerance" had the highest average scores, followed by "conflict" and "salience". The factors "relapse" and "withdrawal symptoms" showed the lowest mean scores. Further examination of the TTAS factor scores indicated that TikTok primarily affects adolescents' mood modification and tolerance. Specifically, problematic TikTok users appear to increasingly rely on the platform to enhance their mood (i.e., salience). Consequently, this increased usage leads to decreased tolerance, as users require more TikTok engagement to feel satisfied. Conversely, the low average scores for "relapse" and "withdrawal symptoms" suggest that adolescents experienced minimal relapse and withdrawal effects. This implies that teenagers reported low levels of negative emotions when unable to use TikTok. Additionally, users infrequently reverted to previous TikTok usage patterns after periods of abstinence.

Moreover, we found a positive association between problematic TikTok use and anxiety symptoms. Two recent studies in China are in accordance with our findings since scholars found that TikTok addictive users show greater levels of anxiety [6,8]. The connection between problematic social media usage and psychological distress may be attributed to the fear of missing out [35]. Constant engagement with social platforms can provoke anxiety related to fear of missing out, potentially leading to more frequent checking of these sites [36]. The effort to keep up with multiple social media accounts simultaneously can generate anxiety, which may intensify the fear of missing out and create a self-perpetuating cycle of increased stress [37]. Research has also indicated that excessive use of social media is associated with decreased creativity and a lowered perception of one's intellectual abilities [38]. Spending considerable time on social media can reduce real-life peer interactions, potentially resulting in feelings of isolation, loneliness, and anxiety [35]. Additionally, individuals experiencing anxiety often prefer online communication due to difficulties with in-person interactions [39]. Problematic social media use may also increase worries about negative evaluations, enhance susceptibility to cyberbullying, and promote negative online exchanges, all of which can contribute to heightened levels of anxiety [40].

Our multivariable analysis identified a positive association between problematic TikTok use and depressive symptoms. Four studies in China, US and Serbia supports this finding since they found that depressive symptoms are more frequent among problematic TikTok users [6–9]. Studies indicate that social media usage can have detrimental effects on emotional state, quality of life, and overall contentment [41–43]. For example, scrolling through social media platforms without actively interacting has been linked to reduce social bonds and heightened feelings of solitude and disconnection [44]. One potential reason for this is that viewing idealized representations of others' lives on these platforms may evoke envy and the false belief that peers are experiencing more fulfilling or prosperous lives [45]. These emotions of jealousy can eventually lead to feelings of inadequacy and depression [46]. Another contributing factor might be the sense of squandering time on trivial social media activities, which could negatively influence one's emotional state [43]. Moreover, the substantial rise in time dedicated to social media has led some experts to propose recognizing "internet addiction" as a distinct condition closely associated with depression [47,48]. An additional hypothesis suggests that depression may arise from reduced self-esteem when users make unfavorable comparisons between themselves and carefully selected images of seemingly more attractive, thinner, popular, or affluent individuals [49,50]. Finally, increased social media exposure may heighten the risk of online harassment, potentially contributing to symptoms of depression [51].

Moreover, we found that levels of sleepiness are higher among adolescents with higher levels of problematic TikTok use. Chao et al. arrived at a similar conclusion since they found that TikTok addictive users show poorer sleep [6]. Additionally, several other studies that investigated the association between social media use and sleep find that excessive social media use results on poor sleep quality, sleepiness at daytime and sleep disturbances [52–58].

4.1. Limitations

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Our study had several limitations. First, we conducted a cross-sectional study, and, therefore, we cannot establish a causal relationship between TikTok use, anxiety, depression, and sleepiness. Longitudinal studies that explore the association between study variables could add significant information. Second, our study population included adolescents aged 18 and 19 years old. Also, we used a convenience sample, and, thus, our results cannot be representative of adolescent TikTok users. Future studies should include random or stratified samples of adolescents aged 10 to 19 years old to produce more representative results. Third, we used valid tools to measure TikTok use, anxiety and depression. However, our participants may compromise their answers due to social desirability bias. Therefore, information bias is probable in our study. Fourth, we measured sleepiness with a simple question. Scholars in future studies should measure sleepiness in a more valid way. Finally, we eliminated only one confounder in our study. Since there are plenty of confounders in the relationship between TikTok use, anxiety, depression, and sleepiness future studies should pay attention to eliminate these confounders.

5. Conclusions

Our research revealed an association between TikTok usage and increased levels of anxiety, depression, and sleepiness among adolescents. Given the limitations of our study and the scarcity of research in this area, additional studies are required to establish more conclusive evidence regarding the relationship between TikTok use and anxiety, depression, and sleepiness. Early identification of TikTok addictive users is essential to promote their mental health and well-being. Healthcare professionals should be alert to recognize symptoms of problematic TikTok use among adolescents. Moreover, policy makers should develop and adopt appropriate interventions to reduce adolescents' TikTok use.

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Data Availability Statement: Our data are available on Figshare repository. 10.6084/m9.figshare.28311713

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