

Nighttime Social Media Usage and Sleep Quality among Youth in District Chakwal, Pakistan



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Abstract: *The increasing use of social media has become an integral part of young people's daily lives, use during nighttime may disrupt healthy sleep patterns. Although previous studies have identified an association between social media use and sleep problems, limited research has specifically examined nighttime use among youth in developing and community-based settings. This study investigated the relationship between nighttime social media usage and sleep quality among 385 youth aged 15–30 years in District Chakwal, Pakistan. Using a quantitative cross-sectional design and stratified random sampling, data were analyzed through descriptive statistics, Spearman's correlation, and linear regression. Nighttime social media usage was significantly associated with poorer sleep quality ($r = .172$, $p = .001$) and significantly predicted sleep quality ($\beta = .173$, $p = .001$), although it explained only 3% of the variance ($R^2 = .030$). These findings highlight nighttime social media use as one contributing factor to sleep problems and underscore the need to promote healthier digital habits among youth.*

Keywords: Nighttime, Social Media, Sleep Quality, Youth, Sleep Patterns, District Chakwal, Pakistan

Introduction

It is rare to come across people who do not use at least one social media platform in today's culture, as social media has become deeply ingrained in daily life. Social media has become an essential part of everyday social interactions and has captured the interest of the majority of people. According to Swar & Hameed (2017), social media refers to "the websites and online tools that empower interactions between users by offering them opportunities to disseminate information, express opinions, and pursue interests. Social media is widely used by young people for a number of purposes, such as amusement, identity development, social improvement (improving offline social status through online contacts), and preserving interpersonal relationships (Ifinedo, 2016). Social media is used for a variety of purposes, including keeping in touch with others, learning new things, staying current and informed about global events, finding amusement, finding employment, and conducting searches (Majeed et al., 2022).

Modern society has benefited greatly from social media, which has also improved communication and information access. Nevertheless, excessive use of social media has serious drawbacks, especially for young adults who have reported spending a significant amount of time on mobile devices interacting with social media. Young adults use a variety of online platforms on a daily basis to connect with one another and participate in various social networking applications on a regular basis (Instagram, Snapchat, Twitter and Facebook), using these online venues to share a wide array of digital content, such as visuals, text, and videos. A landmark study by Crowley et al. (2018) explains that circadian rhythms naturally shift later during adolescence, making late nights common, but social and professional obligations in early adulthood, such as academic or professional obligations, force early wake-ups. Young adults engage with these platforms for a multitude of purposes, encompassing entertainment, communication, and information retrieval.

According to previous research, more than 80 percent of teens aged between 16 years and 19 years have been known to interact with electronic gadgets before bedtime (Hysing et al., 2015). Such late-night activities, such as scrolling through messages, will delay bedtime and cause disruption of sleep, along with arousing the brain mentally. It has long been recognised that blue light from electronic devices, such as

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smartphones, can have a negative impact on the body's ability to produce melatonin, which can disrupt the initiation of sleep. Use of social media before going to sleep can also replace and interfere with sleep time, or increase emotional or cognitive activation, making it more difficult to "shut down" mental activity (Levenson et al., 2017). The use of multiple screens is becoming a common part of children and youth's evening routines. This activity can delay sleep onset (Bartel et al., 2015) even when lights are off for sleep. But research shows that social media usage during the nighttime, especially before bedtime, is associated with increased sleep disturbances (Levenson et al., 2017). Social media networks are becoming dangerous places where sleep disorders and health problems are able to arise.

Social media is in high use and growing in Pakistan. A current investigation estimates that as of 2021, there are around 53 million social media users in Pakistan and that there have been alarming reports of an increasing "threat to mental health" that relates to high usage of social media, such as anxiety, depression, and insomnia (Tin et al., 2024). The national surveys show that the youth in Pakistan are going through significant academic pressure and mental stress, and there is a rise in unhealthy social media usage. Prior research has indicated a link between social media usage and delayed sleep onset (Harbard et al., 2016) as well as reduced sleep duration during adolescence. Most investigations into youth social media usage and sleep have focused on overall daily consumption or adolescent cohorts, rather than specifically addressing nocturnal usage patterns (Boniel-Nissim et al., 2023). The timing of social media engagement is crucial, as late-night activity can distinctly disrupt sleep and exacerbate social anxieties.

Social Media Use and Sleep Disruption

Young adults are increasingly compromising their sleep quality due to nighttime engagement with social media platforms. Numerous studies indicate that utilizing social media before sleep exerts a more detrimental effect on sleep quality than its general usage (Bartel & Gradisar, 2016). Nighttime social media engagement elevates cognitive arousal to a greater extent than daytime usage (Woods & Scott, 2016). In conjunction with the blue light emissions and electromagnetic radiation emitted by electronic devices, cognitive arousal has been demonstrated to alter sleep architecture (Hamblin & Wood, 2002), which refers to the fundamental structure of sleep patterns, primarily due to the inhibition of melatonin synthesis, thereby postponing the circadian rhythm (Cain & Gradisar, 2010). Specifically, it has been demonstrated that when smartphones are used as an environmental stimulus before bed, the blue light radiation they emit suppresses melatonin secretion, continuously activates the sympathetic nervous system, and disrupts sleep structure, all of which exacerbate anxiety (Hamilton & Lee, 2021). Engaging with social media after initially intending to retire for the night has also been positively correlated with various physical and psychological issues.

These days, smartphones are an essential part of our everyday life. According to recent studies, between 60 and 95 percent of young adults have smartphones (Yang et al., 2017). In addition, Poushter (2016) said that 76 percent of adult smartphone users use social networking sites at least once a day. However, excessive SMU can lead to a number of negative consequences, including exposure to inappropriate content, including unsolicited violent and sexual content (Moreno et al., 2009), gender stereotypes (Jungblut & Hhaim, 2023), cyberbullying (Craig et al., 2020), and self-objectification (Levenson et al., 2017). Delayed sleep onset latency and diminished sleep quality attributed to nighttime social media usage (Woods & Scott, 2016) are associated with symptoms such as headaches, tinnitus, gastrointestinal discomfort, and elevated body mass index (Lajunen et al., 2007).

During nighttime, users may grapple not only with their social media use but also with persistent thoughts about it while in bed. Gibbons & Buunk (1999) assert this phenomenon is called a self-enhancement effect, and Gibbons and Buunk believe that it is driven by a person's efforts to enhance their self-image by comparison to others. Much of this can be attributed to the fact that social media is different from other internet use, as people get notifications constantly on their daily schedule. The first time these notifications appear, they do make for a poor night's sleep, with 89% of the youth reporting that they leave their phones in their bedrooms, sometimes under their pillow, and even holding their phone in their hands while sleeping (Lenhart et al., 2010). The overabundant warnings intensify a fear of missing out, and result in a feeling of

obligation to be accessible at any time. Consequently, it is reasonable to posit that young adults, particularly those who experience insecurity regarding their self-worth, encounter difficulties in achieving relaxation at night and are susceptible to the aforementioned detrimental cycle (Thomée et al., 2010).

Despite the growing body of international evidence on the relationship between social media use and sleep, several important gaps remain. Much of the existing research has examined overall daily social media use or focused on adolescents and university students in developed countries, while comparatively little attention has been given to nighttime social media usage as a distinct behavioral pattern and its influence on sleep quality among youth in developing settings. In Pakistan, empirical evidence on this issue is still limited, particularly at the community level, and no published study has specifically investigated this association among youth in District Chakwal, where increasing smartphone accessibility and widespread social media engagement may have unique implications for sleep health. Addressing this gap is important for understanding how late-night digital behaviors affect the well-being of young people within the local socio-cultural context. Therefore, the present study aims to address this gap by examining the association between nighttime social media usage and sleep quality among youth in District Chakwal, Pakistan.

Research Objectives

1. To describe the patterns and characteristics of nighttime social media usage among youth in District Chakwal.
2. To assess the relationship between nighttime social media usage and sleep quality among youth.
3. To determine whether nighttime social media usage significantly predicts sleep quality among youth.

Sleep Displacement Theory

Sleep Displacement Theory, originally proposed by Van den Bulck (2004), provides a theoretical basis for understanding how media use may interfere with sleep. The theory is based on the premise that individuals have a finite amount of time available within a day; therefore, time devoted to media activities may compete with time that could otherwise be allocated to sleep. From this perspective, television viewing, internet use, smartphone use, and social media engagement may displace sleep when these activities extend into periods normally intended for rest. Van den Bulck (2004) demonstrated that media use was associated with changes in bedtime and sleep-related behaviors, providing an early theoretical explanation for the relationship between media engagement and sleep.

The concept was further developed by Exelmans and Van den Bulck (2017), who distinguished between the time individuals go to bed and the time at which they actually attempt to fall asleep. They conceptualized the interval between going to bed and attempting to sleep as “shut-eye latency.” This distinction is particularly relevant to nighttime social media use because individuals may go to bed at their intended bedtime but continue scrolling, messaging, watching videos, or checking social media before attempting to sleep. Consequently, continued media engagement after going to bed may extend wakefulness and reduce the time available for sleep.

In the context of the present study, Sleep Displacement Theory suggests that nighttime social media use may compete directly with sleep by occupying time during periods intended for rest. When social media engagement continues into the night, it may delay the transition from wakefulness to sleep and reduce the opportunity for adequate sleep duration. Thus, nighttime social media use can be understood not simply as an activity occurring before sleep, but as a behavior that may occupy time otherwise available for sleep.

Sleep Displacement Theory provides a relevant conceptual framework for examining the relationship between nighttime social media activity and sleep quality among youth. In the present study, nighttime social media activity represents the media behavior that may compete with time available for sleep, while sleep quality represents the frequency of sleep-related problems experienced by participants. From this perspective, greater nighttime social media engagement is expected to be associated with poor sleep quality because continued media engagement during the intended sleep period may delay or displace sleep.

Methodology

This study employed a quantitative cross-sectional research design to examine the association between nighttime social media usage and sleep quality among youth in District Chakwal. The study was restricted to District Chakwal of Punjab with three tehsils, Chakwal, Choa Saidan Shah, and Kallar Kahar, and involved only youths aged 15-30 years, both male and female. A stratified random sampling technique was employed, using the estimated number of youths in the tehsils as the strata and using the number of youths in each tehsil by sex as the sub-strata. Cochran's (1977) formula for large populations was used to calculate the desired sample size of 385 respondents at a 95% confidence level with a 5% margin of error. The data were gathered by a self-administered closed-ended Urdu-translated questionnaire using a mixed-mode approach in which the questionnaire was administered in person and also online using Google Forms. The online survey was conducted mainly with geographically remote respondents and females in rural areas where their interactions with the researcher were hampered by socio-cultural norms. A total of 385 responses were selected for this research.

Sleep-related outcomes were assessed using selected items adapted from the original Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989). Because the present study focused specifically on nighttime social media activity and sleep quality, a modified set of PSQI items was used rather than the complete original PSQI scoring procedure. IBM SPSS Statistics, version 20, was used to analyze data. The descriptive statistics such as frequencies, percentages, and means were calculated to present characteristics of the respondents and study variables. Inferential analysis was then performed using Spearman's rank order correlation to determine the correlation between the use of social media at night and sleep quality. Simple linear regression was subsequently performed to see if there was a significant relationship between sleep quality and use of social media at night. Effect sizes were used in addition to p-values because of this relatively large sample size ($N = 385$; Miola & Miot, 2021). The ethical principles were adhered to in the study, such as obtaining informed consent, ensuring the voluntary participation of the participants, and ensuring their anonymity and confidentiality.

Results

Table 1

Socio-demographic Characteristics of 385 Participants

Sample Characteristics	F	%	M	SD
Gender				
Men	192	49.9		
Women	193	50.1		
Age			2.17	0.42
Education				
Primary	10	2.6		
Middle	18	4.7		
Matric	42	10.9		
Intermediate	119	30.9		
Bachelor	189	49.1		
Master and Above	7	1.8		
Residence				
Rural	190	49.4		
Urban	134	34.8		
Semir-rural	61	15.8		
Tehsil				
Chakwal	261	67.8		
Kallar Kahar	68	17.7		
Choa Saidan Shah	56	14.5		

Note. F=Frequency, %=Percentage, M=Mean, SD=Standard Deviation

Table 1 gives an overview of the socio-demographic attributes of the 385 youth who took part in this research. It is noteworthy that there is an almost equal distribution of males (49.9%) and females (50.1%). Most participants were educated to a Bachelor's level (49.1%) and a good portion (30.9%) had Intermediate education, suggesting that the sample consisted mainly of young people with relatively high levels of formal education. As far as residence is concerned, 49.4% of youth lived in rural areas, 34.8% in urban areas, and 15.8% in semi-rural areas, indicating the residential background of youth in the District Chakwal. The representation from different Tehsils also suggests that Chakwal Tehsil had the highest representation (67.8%), Kallar Kahar (17.7%), and Choa Saidan Shah (14.5%) in this research.

Table 2

Sleep Characteristics of 385 Participants

Sample Characteristics	F	%
Sleep duration		
Less than 5 hours	38	9.9
5 – 6 hours	106	27.5
6 – 7 hours	107	27.8
More than 7 hours	134	34.8
Sleep onset latency		
Less than 15 minutes	120	31.2
15 – 30 minutes	161	41.8
31 – 45 minutes	71	18.4
46 – 60 minutes	33	8.6
Overall subjective sleep quality		
Very good	102	26.5
Fairly good	190	49.4
Fairly poor	86	22.3
Poor	7	1.8

Note. Sleep quality was calculated from selected PSQI-derived items; higher scores indicate greater sleep difficulties (poorer sleep quality).

The sleep characteristics of the participants are summarized in the above table, and it is clearly seen that there is a wide range of sleep patterns. 34.8% of the participants reported sleeping more than 7 hours per night, 27.8% reported sleeping for 6–7 hours per night and 27.5% reported sleeping for 5–6 hours per night. A lower percentage (9.9%) slept for less than 5 hours. In terms of sleep onset latency, 41.8% of participants slept between 15 and 30 minutes, and 31.2% slept within 15 minutes. In terms of subjective sleep quality, almost half of the participants (49.4%) described their sleep as fairly good, while 26.5% rated it as very good. But 22.3% reported fairly poor sleep quality and 1.8% reported poor sleep quality.

Table 3

Percentage distribution of nighttime social media usage by platform

Platform	Never%	Rarely%	Sometimes%	Often%	Always%
Facebook	43.6	14.8	18.7	13.2	9.6
Instagram	14.3	16.9	20.5	17.7	30.6
Tiktok	19.0	11.7	16.6	24.2	28.6
Snapchat	28.8	26.2	15.8	11.4	17.7
WhatsApp	.5	2.9	12.7	34.0	49.9
YouTube	11.9	20.3	21.6	17.7	28.6
Others	42.1	27.0	15.8	5.7	9.4

Note: N = 385. Scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always. Percentages may not total 100 due to rounding.

Figure 1
Frequency of Nighttime Social Media usage by Platform (N=385)

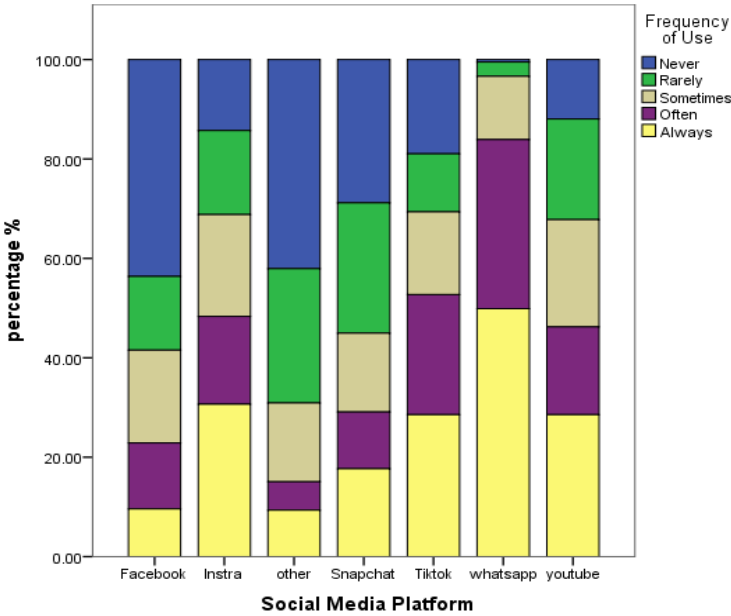


Table 3 and Figure 1 show variation in nighttime social media use across platforms. WhatsApp had the highest reported nighttime use, with 49.9% of participants reporting always using it and 34.0% reporting often using it. Instagram also showed relatively high nighttime engagement, while Facebook and other platforms had higher proportions of respondents reporting never using them at night. TikTok and Snapchat showed more varied distributions across the response categories.

Table 3
Correlation among Social Media Activity and Sleep Quality Score (N=385)

		SMA	sleepQ
SMA	Correlation Coefficient	1.000	.172**
	Sig. (2-tailed)	.	.001
	N	385	385
Sleep Quality Score	Correlation Coefficient	.172**	1.000
	Sig. (2-tailed)	.001	.
	N	385	385

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 presents a statistically significant positive association between nighttime social media activity and sleep quality ($r = .172$, $p = .001$), indicating that higher levels of nighttime social media activity were associated with higher sleep quality.

Table 4
Regression coefficients for Social Media Activity and Sleep Quality Score (N=385)

Variables	B	SE	β	t	p	R ²	F	df
Constant	12.89	0.76	-	17.05	.000			
SMA	0.14	0.04	0.173	3.44	0.001	0.030	11.82	1,383

The results of table 4 present a positive relationship (regression coefficient $B = 0.14$; $\beta = 0.173$; $p = .001$) between nocturnal social media engagement and sleep-related changes which is the case of lower sleep quality score. Predictor variable was statistically significant ($t = 3.44$; $p = .001$), and the overall regression

model had been statistically significant ($F = 11.82$; $p < .05$). Nighttime social media activity was statistically associated with sleep quality scores, but the small $R^2 = 0.030$ indicates that it explained only a limited proportion of the variation in sleep quality score.

Discussion

Sleep Characteristics of Youth

The results in the sleep characteristics show a lot of variation among the sleep patterns of youth in District Chakwal. 37.4% reported sleeping 6 hours or less per night, while 34.8% reported sleeping greater than 7 hours per night, and 27.8% reported sleeping 6 to 7 hours per night. Likewise, 27.0% of participants said they took more than 30 minutes to fall asleep, and 24.1 per cent said their sleep was fairly poor or poor. These results indicate that a significant number of participants had relatively good sleep, but a meaningful number of participants had poor sleep duration, poor sleep onset latency, and poor sleep quality. This is consistent with past research that young people's sleep can be influenced by exposure to electronic media in the evening and at night. In a review of 36 studies, Cain and Gradisar (2010) identified that sleep outcomes associated with the use of electronic media included delayed bedtime and shorter total sleep time. Likewise, Boniel-Nissim et al. (2023) found that extreme and problematic SMBU were linked to delayed bedtime and reduced sleep time in 86,542 adolescents from 18 European and North American countries. This could be because digital content during the night could be disrupting sleep time that is normally at night, or because the process of going to sleep could be extended. Exelmans and Van den Bulck (2017) state that this process occurs both at bedtime and in the interval preceding sleep, implying that sleep initiation is not necessarily accompanied by an immediate sleep attempt. From the standpoint of Sleep Displacement Theory, the time devoted to the media at night can be counterproductive to sleep. Thus, the sleep phenotype reported in the current study underscores the need to focus on nighttime sleep, and not just overall social-media usage, when studying youth sleep health.

Pattern of Nighttime Social Media Usage

The descriptive findings indicate that the use of social media during the nighttime was widespread among participants, but differed greatly between the differed greatly across various social media applications. The highest usage at night was seen for WhatsApp, with 49.9% saying they always used this application at night and 34.0% saying they often used this application at night. Instagram also had significant nighttime engagement, with 30.6% of users saying they always use Instagram, and TikTok and YouTube were both reported as always used by 28.6% of users. Facebook and other platforms, on the other hand, were less used at night. The above pattern implies that youth social media usage in District Chakwal is not limited to any specific platform, as they are using social media in three different fields such as communication, entertainment, and consumption of content. Similarly, previous studies have shown that social-media use right before sleep is a specific factor associated with sleep quality. In 2017, Levenson et al. from the United States conducted a study that included a nationally representative sample of 1,763 young adults and concluded that any type of social media use in the 30 minutes preceding sleep was linked to sleep disturbance, even after controlling for overall social media use. Therefore, the district-specific pattern observed in District Chakwal is of relevance for providing some context on how night-time social-media usage is integrated into youth's normal sleep routine and can compete with it.

Association Between Nighttime Social Media Usage and Sleep Quality

The results showed a positive correlation between nighttime social-media use and the sleep-quality score, which was statistically significant ($r = .172$, $p = .001$, $N = 385$). The correlation was low but still statistically significant, meaning that more social media use at night was linked to higher scores on the sleep quality. The result suggests that the more youth engaged with social media during the night, because higher values on the modified sleep-quality measure represented greater sleep difficulties, the positive correlation indicates that greater nighttime social media activity was associated with poorer sleep quality. Generally, this finding

is similar to the existing empirical evidence. Woods and Scott (2016) found that overall and night-time specific social media use were both correlated with sleep quality, with night-time specific use being a significant predictor of sleep quality. Likewise, Levenson et al. (2017) identified an independent relationship between social-media use just before bedtime and sleep quality in young adults. The results of the large cross-national study carried out by Boniel-Nissim et al. (2023) also revealed a link between excessive and problematic social media use and delayed bedtime and reduced sleep in 18 European and North American countries. In 2016, an investigation was made into the connection between social network use and the mental health of the respondents. Results showed that there was a negative correlation between ages of 18-29. But for those over 29, there was a positive association (Hardy & Castoguy, 2018). Increased social media use before one goes to sleep may be linked to decreased sleep duration and sleep difficulties, which may then be tied to greater depression symptoms, as cited by Lemola et al. (2015).

Furthermore, Oshima et al. (2012) found that after lights out, use of screen-based media devices was related to more anxiety and depressive symptoms, which could contribute to an increased risk of suicidal ideation and self-injurious behaviors. Similarly, Kelly et al. (2018) discovered that overuse of social media was related to poorer sleep quality, amongst other factors, and lack of sleep was associated with greater depressive symptomatology. Several concurrent processes could be responsible for the present finding. The first is that the time they spend on social media at night replaces sleep. Second, interactive communication and content consumption might lead to higher levels of cognitive engagement and make it harder to disengage from online activity. Third, the smartphone notifications and the feeling of being available via social media could lead to more frequent social media usage during what is supposed to be a time of rest. Fourth, the feeling of being available through social media and smartphone notifications may lead to more frequent social media use during the time set aside for rest. The theory of sleep displacement is especially relevant in light of the fact that it is a theory of media use in terms of competing for limited daily time allocated to sleep. The present finding thus supports the theoretical approach for the study of youth's nighttime social media usage in District Chakwal.

Predictive Relationship Between Nighttime Use of Social Media and Sleep Quality

The regression analysis also revealed that nighttime social-media use significantly predicted the sleep-quality score ($B = 0.14$, $SE = 0.04$, $\beta = .173$, $t = 3.44$, $p = .001$). The overall regression model was statistically significant, $F(1,383) = 11.82$, $p < .05$, but explained only a modest amount of the variance in sleep-quality scores ($R^2 = .030$), which means that nighttime social-media activity accounted for about 3.0% of the variance. The finding is significant because it is no longer a correlation but a predictive model, and the relationship observed in the correlation still holds true. However, the relatively low R^2 suggests that using social media at night is not the only factor that affects sleep quality, and shouldn't be viewed as the main or most important factor. Some prior studies, however, have found that nighttime social-media use is a significant correlate of sleep problems. In a study in which anxiety, depression, and self-esteem were taken into account, Woods and Scott (2016) found that sleep quality was predicted by nighttime-specific social media use.

This current study may thus represent a small but significant contribution to the variation of sleep quality in youth, associated with digital behavior at night. This finding is consistent with Sleep Displacement Theory, which suggests that people who spend more time with media in their sleep time have less opportunity to fall asleep and spend more time falling asleep. The use of electronic media also has been shown to be associated with sleep displacement at bedtime and during the pre-sleep period (Exelmans & Van den Bulck, 2017). In an applied sense, the small size of the effect should not be interpreted as a lack of importance of night-time social-media use but as a call for interventions to improve youth sleep to consider night-time digital behavior as one factor among a number of sleep-related behaviors.

Limitations

The study had some limitations that need to be taken into account when interpreting the results. For one, the cross-sectional design collects social media utilization and sleep quality at a single time, and this implies that they convey an association, not the reason for the social media utilization or sleep quality. Secondly, the study used self-reported responses (fill in the blank) and therefore might be subject to recall and/or reporting biases. Third, rather than the full scoring procedure, selected and modified PSQI items were used to assess sleep quality, which may limit the generalizability of the findings compared to studies using the PSQI. Fourth, the relatively low effect size ($R^2 = .030$) suggests that nighttime social media use contributed only a small proportion of the variance in sleep quality, and that sleep quality may be influenced by additional unmeasured factors. Lastly, the study was conducted with the youth of three tehsils of District Chakwal and the sample was not equally distributed in all the tehsils, thereby restricting the findings to other populations or settings.

Conclusion

The findings of this study concluded that nighttime social media usage is significantly related to sleep quality among youth of district Chakwal, Pakistan. The results show that the amount of time spent on social media at night is correlated with lower sleep quality, albeit weakly, and that nighttime social media use accounts for a small share of the variance in sleep quality scores. While social media use at night may be a behavior that helps determine sleep quality among youth, it should not be the only way to measure youth sleep quality. The study emphasizes the need for more attention to the awareness of a youth's night-time digital habits and calls for more research with longitudinal designs and comprehensive measures of sleep, to further elucidate this relationship among the youth of Pakistan.

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