Pakistan Journal of Psychological Research, 2024, Vol. 39, No. 4, 813-831

https://doi.org/10.33824/PJPR.2024.39.4.44

Effect of Social Networking Addiction on Memory Functioning and Aggression Among University Students: Mediating Role of Sleep Quality

Mussarat Jabeen Khan, Bisma Khan, Fizza Ismail, Adeena Khan, Aliya Ahmad, and Saamia Sagheer

International Islamic University

The purpose of this study is to investigate the relationship between social networking addiction on memory functioning and aggression among university students. Moreover, the mediating role of quality of sleep was also studied between social networking addiction, memory functioning and aggression. The study also investigated the relationship of demographic variable (gender) with social networking addiction, memory functioning, aggression and sleep quality among university students. The sample was comprised of (N = 405) university students among them (n = 203) were male and (n = 202) were females having age ranges from 18 to 27 years, undergraduate bachelor level students. Data was collected from different universities of Islamabad, Lahore, Peshawar, Haripur and Rawalpindi. In this research four scales are used to measure four variables i.e., Social Networking Addiction Scale (SNS) (Griffiths, 2005), Buss-Perry Aggression Questionnaire (Buss & Perry, 1992), Multifactorial Memory Functioning Scale (MMQ) (Troyer & Rich, 2002) and sleep Quality Scale (SQS) (Yi et al., 2006). Results of this study revealed that social networking addiction causes lower memory functioning and higher aggression, there is negative correlation between poor sleep quality and memory functioning and positive correlation between poor sleep quality and aggression. The other significant finding is that male and female university students are almost equally addicted to social networking addiction.

Keywords. Social networking addiction, aggression, sleep quality, memory functioning

---

Mussarat Jabeen Khan, Bisma Khan, Fizza Ismail, Adeena Khan, Aliya Ahmad, and Saamia Sagheer, Department of Psychology, International Islamic University, Islamabad, Pakistan.

Correspondence concerning this article should be addressed to Mussarat Jabeen Khan, Department of Psychology, International Islamic University, Islamabad, Pakistan. Email: mussarat.jabeen@iiu.edu.pk

People engage in internet for several activities as it is very entertaining and enlightening medium but some of the activities on the internet may be addictive e.g., social media usage (Kuss & Griffiths, 2011). The study conducted, emphasized that Facebook, Instagram, Twitter, Snapchat, WeChat, and WhatsApp are the most widely used social media apps today and all of these apps have their own way of attracting the users therefore, leading to social media addiction (Hashem & Muda, 2020). Memory is a system that provides us knowledge that we need for future use. Excessive usage of internet also impacts the normal functioning of our memory. Sleep is very important for everyone to carry out normal day to day life. It is optimal to sleep at least 7 to 9 hours on a normal basis by American Academy of Sleep Medicine (Paruthi et al., 2016). Using social media late at night is common with adults on normal routine. There also exist a significant relationship between social networking addiction and aggression (Rau, et al., 2021). Too much usage of social media is linked to aggression although frequent use of it may lower the rate of distress in individual by providing him/her with opportunities and rewards to engage in different activities (Ko et al., 2009). Another study revealed the high correlation in social media addiction and aggression (Yen et al., 2008).

Relationship Between Social Networking and Memory Functioning

Social media addiction and cognitive functions are correlated with each other both positively and negatively, mainly with memory. The social media addiction is correlated negatively with cognitive function or memory when an individual has a higher-than-average social media usage which indicates higher social media addiction and lower cognitive function or memory. Whereas, the social media addiction is correlated positively with cognitive functions or memory. When an individual has a lower than average social media usage which indicates lower social media addiction and high cognitive function or memory (Hashem & Muda, 2020). The excessive use of internet made the user to forget their work and responsibilities sometimes (Swain & Pati 2021).

In a study we came to know that the use of social media impacted short-term memory in college students if it is use during or after the presentation of new knowledge (Scheer et al., 2009). There are now 3.196 billion users worldwide of social networking sites (SNSs), according to data. Moreover, there is proof that regular use of SNSs (defined as more than two hours per day) can be linked to poor mental health, increased levels of psychological distress, and suicidal

thoughts, as well as being slightly problematic and addictive to small minority of masses (Sampasa-Kanyinga & Lewis, 2015). It has been identified that the more time on social media means high chances of social media addiction (Otu, 2015).

Relationship Between Social Networking and Aggression

Addiction of social media causes trouble for teens and adolescents in previous years too much use of SNSs can create obstacle in having good mental state (Xu & Tan, 2012). Aggression may arouse by social media use (Brown & Bobkowski, 2011). Using the internet may lower the distress by giving quick rewards and chance to involve in various activities, surplus use of internet is key risk element for aggression (Ko et al., 2009). Aggression is severe developmental issue among students (Kassabri, et al., 2004). The important point here is that we can say that young adults expose to social media to a very large extent (Myers, 2015). Facebook addiction was examined through a study conducted among 1000 undergraduate students of Nigerian university. This study utilized FB Addiction Symptoms Scale (FASS). FASS includes five categories; there are three items under each category. These 5 categories are: how much SNSs are important to you, loss of control, captivation, awful life consequences, and recluse 31% of respondents reported using Facebook every hour. This study revealed low level of Facebook addiction i.e., 1.6%. But researcher emphasized that results may have been impacted because of less access of internet in Nigeria (Alabi, 2012). In a study it is proved that Facebook addiction and aggression is highly correlated (Arendain et al.., 2016).

Relationship Between Social Networking and Sleep Quality

Daily life works and education are affected due to addiction, it distracted our attention and we start spending our huge amount of time on these networks (Pantic, 2014). In short, heavy use of media can disturb patterns of waking and sleeping (Punamaki et al., 2007). An experiment was done on two groups of men, one group sleeps for 7-8 hours per night and the other group 9.5-10.5 hours per night, and score of groups with shorter period of sleep was higher on anger and hostility on a mood scale (Taub, 1977). The unlimited use of social media by adolescence during bedtime increase an issue about adolescents having a bad academic performance, disturbance in waking and sleep timing and by the extensive use they accomplish their emotional desires. The deficient of sleep and decrease of sleep quality is associated with the use of cell phone. (Punamaki, et al.,

2007). The model of good sleep is harmfully associated to use of social media and playing games.

The connection of "Social Networking Sites addiction" SNSs use with sleep quality has been investigated in a few researches. For instance, a study looked into the connections between Peruvian students' reliance on Facebook and their bad sleep habits. According to the findings, 8.6% of the sample had a Facebook habit, and 55% of the sample reported having poor sleep.

Facebook addiction and poor sleep quality were found to be significantly associated (mainly explained by daytime dysfunction). In order to increase sleep quality and moderate Facebook use, the authors came to the following conclusion. A link between excessive Facebook use and poor sleep quality has also been noted in in-depth case studies (Wolniczak et al., 2013).

Relationship Between Sleep Quality and Memory Functioning

Cognitive performance can badly affect by sleep loss, for example it causes less sustained attention and reduces memory functioning (Maquet, 2001). Prospective memory tasks are executed far well than “bad” sleepers, in “good” sleepers (Fabbri et al., 2014). Findings recommended that both poor sleep quality and depressed mood could lower the amount of information that can be retained in operating memory (Scheer et al., 2009). A finding of one year fellow-up study revealed that adolescents use the cell phones for the purpose of texting and making out call after lights. Social networking makes the person so tired so that a person face difficulty in focusing the study. Thus, the students become tried and sleepy in the class and face trouble in their academic activities such as they cannot manage time well, cannot be consistent in efforts, shows no interest in studies and loss attention in the class which results in poor performance (Bulck, 2004). In one of study, it is stated that sleep troubles have been linked to mental health problems (Baglioni et al., 2016). Other study shows that greater sleep has been found to have a positive impact on the quality of life connected to physical health and cognitive function in successful agers (Driscoll et al., 2008). Poor sleep quality has been linked in longitudinal studies to eventual cognitive loss (Pot-vin et al., 2012). After reviewing the research on the effects of sleep loss on cognition, came to the conclusion that even mild sleep decreases significantly impair performance across a number of cognitive domains (Waters & Bucks, 2011).

Relationship Between Sleep Quality and Aggression

People who sleep little than 5 hours per night has a 3 times higher risk of losing temperament and engaging in physical aggression (Vaughn et al., 2015). Studies show that aggression and sleep quality are reversible, poor sleep is directly proportional to aggression (Kamphuis et al., 2014). Aggression appears to be related with poor sleep-in adolescents and children (O'Brien, 2009). Not sufficient sleep quality during night cause sleeping for longer time during day (Kamphuis et al., 2012). In an experiment, proactive and reactive aggression levels were higher in those prisoners who perceived poor sleep than those perceiving good sleep (Barker et al., 2016). According to one of study higher levels of sleepiness were related to community violence (Bagley et al., 2015). Aggression is severe developmental issue among students (Kassabri et al., 2004). The scores on aggressive behavior were higher in those children who were judged as overtired. Researchers have the idea that emotional control is due to good sleep, and poor sleep can result in its loss which includes aggression regulation (Kamphuis et al., 2012). In Addition to cut off a social behavior is due to the deficiency of sleep is linked with enhanced aggression and irritation (Greene et al., 2006). The act of violence, annoyance, lack of sympathy and aggression is caused due to deficiency of sleep quality (Birkley et al., 2015). In another study the same thing is confirmed that individual thoughts of annoyance, depression, misunderstanding, and irritation are linked with the deficiency of Sleep (James & Gregg, 2004).

Objectives

1. To examine the effect of social networking addiction on memory functioning and aggression among university students.
2. To find out the mediating role of sleep quality among social networking addiction and memory functioning among university students.
3. To identify the mediating role of sleep quality between social networking addiction and aggression among university students.
4. To study the relationship of demographic variable (gender) with social networking addiction, memory functioning, aggression and sleep quality.

Hypotheses

In the light of literature, the present study hypothesizes following statements:

1. There is a negative relationship between social networking addiction and memory functioning among university students.
2. There is a positive relationship between social networking addiction and aggression among university students.
3. Sleep quality plays a mediating role between social networking addiction and memory functioning among university students.
4. Sleep quality plays a mediating role in the relationship between social networking addiction and aggression among university students.
5. Male university students are higher at social networking addiction than female university students.
6. Male university students are higher at aggression than female university students.

Method

The method in this study refers to the systematic approach used to investigate the relationship between social networking addiction, memory functioning, aggression, and the mediating role of sleep quality among university students. Cross- Sectional survey design was used in the study**.** The data was collected using questionnaires regarding the variables of the study from different areas of Pakistan.

Participants

The sample of the study was conveniently drawn, comprises of 405 University students (Female = 202, Male = 203). The sample was collected from the different universities of Islamabad, Rawalpindi, Wah Cantt, Haripur, Peshawar and Lahore. The data was collected by using non-probability sampling technique. The inclusion criteria are only University students of bachelor/undergraduates were approached in sampling. Age range was 18 to 27 years.

Measures

Social Networking Addiction Scale

This scale is based on the component model proposed by Griffiths (2005) which illuminates the significance of dimensions in addiction. It is a 7-point Likert scale and consist of 21 items with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Somewhat Disagree*, 4 = *Neither Agree nor Disagree*, 5 = *Somewhat Agree*, 6 = *Agree*, and 7 =

Strongly Agree. There are two different ways of using these scales depending on practice or research. As cross-sectional survey method was used in this study. Therefore, by summing up all items, scores are obtained. The range of the score is from 21-147. The score above 84 indicates addiction. Test-retest reliability of the scale is .88. The study used questionnaires in English because our sample was university students so it was easy for them to understand.

The Aggression Questionnaire

Aggression Questionnaire (Buss & Perry, 1992) has 29 items with a 5-point Likert scale; 1 = Extremely Uncharacteristic of Me, 2 = Somewhat Uncharacteristic of Me, 3 = Neither Uncharacteristic nor Characteristic of Me, 4 = Somewhat Characteristic of Me, 5 = Extremely Characteristic of Me. Greater level of aggression is related to higher scores on the scale. The test-retest reliability of the scale is .78.

Sleep Quality Scale

SQS "Sleep Quality Scale" (Yi et al., 2006) consist of 28 items with 4-point Likert scale; 0 = rarely, 1 = sometimes, 2 = often, and 3 = almost always. This scale measures six different factors including, daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction. It includes more items related to daytime dysfunction. Scoring range of SQS is 0-84, with higher score showing higher degree of satisfaction. Scoring of the Items which measure satisfaction with sleep and restoration after sleep is reversed before being tallied. Scoring ranges from 0 to 84 with higher score indicating more acute sleep problems. Internal consistency of .92 and test-retest reliability of .81 was found.

Multifactorial Memory Questionnaire

MMQ (Troyer & Rich, 2002) consist of 18 items with 5-points Likert scale; *strongly Agree* = 4, *Agree* = 3, *Undecided* = 2, *Disagree* = 1, and *Strongly Disagree* = 0. Cronbach alpha showed internal consistency of α = .95, .93, and .83 for Satisfaction, Ability and Strategy respectively. Test-retest reliability for Satisfaction, Ability and Strategy is r = .93, .86, and .88 respectively (Troyer & Rich, 2002).

Procedure

Permission letter was issued by higher authorities of university so that researchers can gain access to the students of other universities to

collect data for the research which is effect of social networking addiction on memory functioning and aggression among university students: mediating role of sleep quality. Informed consents were signed by the student to insure them that their data will be kept confidential. The sample size was consisted of 405 bachelor's degree student among them 203 males and 202 females were taken. Respondents were instructed to give their responses as genuinely as possible. The data was analyzed by SPSS.

Results

The demographic variables included in the study are 50.1% male, 49.9% female, 65.2% nuclear, 34.8% joint family type, 90.3% single, 9.7% married. Age range of the sample was taken 18-27 which was divided into 2 categories from which 65.3% students fall in age range 18-21 while 34.7% in age 22-27. Total sample is four hundred and five university students.

Table 1: *Descriptive Statistics and Alpha Reliability Coefficient of Social Networking Addiction, Memory Functioning, Aggression and Sleep Quality Among University Students (N = 405)*

				Range			
Variables	K	Alpha	*M (SD)*	Actual	Potential	ske	Kur
Social Networking Addiction	21	.89	81.65(22.88)	21-138	21-147	.11	-.45
Memory Functioning	18	.86	40.87(4.75)	30-54	0-72	.26	-.41
Aggression	29	.79	82.89(14.60)	37-131	29-145	.31	.51
Sleep Quality	28	.81	39.61(12.26)	0-81	0-84	.20	.44

Note. Ske = Skewness; Kur = Kurtosis.

The Table 1 shows descriptive statistics and alpha coefficient reliability of study variables, the alpha coefficient of social networking is .89, the alpha coefficient of memory functioning is .66, the alpha coefficient of aggression is .79 and the alpha coefficient of sleep quality is .81.

Table 2: *Correlation Matrix of Study Variables (N = 405)*

Variables	1	2	3	4
Social Networking Addiction	-	-.13**	.28**	.21**
Memory Functioning		-	-.05	-.17**
Aggression			-	.31**
Sleep quality				-

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 2 shows the relationship between Social Networking Addiction, Memory Functioning, Aggression and Sleep Quality among university students. Social Networking Addiction is positively and significantly correlated with Aggression (r = .28**) and Sleep Quality (r = .21**) and negatively correlated with Memory Functioning (r = -.13**), Memory Functioning is negatively correlated with Aggression (r = -.05) and Sleep Quality (r = -.17**) and Aggression is positively significantly correlated with Sleep Quality (r = .31**).

Table 3: *Mediating Effect of Sleep Quality in Relation Between Social Networking Addiction and Memory Functioning Among University Students (N = 405)*

Predictors	Memory Functioning				
Model	R^2	*B*	*p*	*t*	*CI*
Constant		30.35	.000	13.69	[25.99, 34.70]
Social Networking addiction	.04	.11	.000	4.33	[.06, .16]
Constant		44.84	.000	42.88	[42.78, 46.89]
Social Networking addiction		-.02	.056	1.91	[-.04, .00]
Sleep quality	.03	-.05	.002	3.03	[-.09, -.02]

Note. For step 1*: F* = 18.8, For step *2: F* = 8.02.

Table 3 shows the effect of social networking addiction on memory functioning with the mediating role of sleep quality among undergraduate university students. Sleep quality plays a mediating role between social networking addiction and memory functioning. The findings revealed that there is negative relation between sleep quality and memory functioning. As the scale of sleep quality that is used in the study as an instrument mostly contain those items which measures poor sleep, so there is negative correlation between poor sleep quality and memory functioning. In step 1 the R^2 value of .04 revealed that the social networking addiction explained 4% variance

in sleep quality with F (18.8, $p < .001$). The finding revealed that there is positive relation in social networking addiction and sleep quality $\beta = .11$. In step 2 the R^2 value .03 revealed that sleep quality explained 3% variance in memory functioning with F (8.02, $p < .01$). The findings revealed that there is negative relation in sleep quality and memory functioning $\beta = -.05$.

Table 4: *Mediating Effect of Sleep Quality Scale in Relation Between Social Networking Addiction and Aggression Among University Students (N = 405)*

Predictors	Aggression				
Model	R^2	*B*	*p*	*t*	*CI*
Constant		30.31	.000	13.69	[25.96, 34.66]
Social Networking addiction	.04	.11	.000	4.37	[.06, .16]
Constant		58.93	.000	19.59	[53.01, 64.84]
Social Networking addiction		.14	.000	4.70	[.08, .20]
Sleep quality Scale	.14	.31	.000	5.56	[.20, .42]

Note. For step 1: $F = 19.16$, For step 2: $F = 33.67$.

Table 4 shows the effect of social networking addiction on aggression with the mediating role of sleep quality among undergraduates. In step 1 the R^2 value of .04 revealed that the social networking addiction explained 4% variance in sleep quality with F (19.1, $p < .001$). The finding revealed that there is positive relation in social networking addiction and sleep quality $\beta = .11$. In step 2 the R^2 value .14 revealed that sleep quality explained 14% variance in aggression with $F(33.67, p < .001)$. The findings revealed that there is positive relation in sleep quality and aggression $\beta = .31$.

Sleep quality plays a mediating role between social networking addiction and aggression; findings revealed that there is positive relation between poor sleep quality and aggression.

Table 5 indicates the difference between male and female university students on Social Networking Addiction, Memory Functioning, Aggression and Sleep Quality. There is non-significant difference between male and female university students on Social Networking Addiction, Memory Functioning and Sleep Quality. Female university students are higher at Aggression ($M = 84.44$, $SD = 14.42$) than male university students ($M = 81.36$, $SD = 14.64$).

Table 5: *Mean, Standard Deviation and T Value of Male and Female University Students on Social Networking Addiction, Memory Functioning, Aggression and Sleep Quality (N = 405)*

Variables	Male (n = 203)		Female (n = 202)				Confidence Interval	
	M	*SD*	*M*	*SD*	*t*	*p*	*LL*	*UL*
Social networking addiction	81.14	22.18	82.16	23.62	.45	.653	-5.50	3.45
Memory Functioning	41.09	4.56	40.65	4.93	.93	.352	-.48	1.36
Aggression	81.36	14.64	84.44	14.42	2.12	.034	-5.91	-.23
Sleep Quality	38.76	12.12	40.46	12.37	1.38	.166	-4.09	.70

Discussion

The objective of the study is to examine the effect of social networking addiction on aggression and memory functioning considering the mediating role of sleep quality among university students, for these six statements hypotheses is formulated.

According to first hypothesis, there is negative relationship between social networking addiction and memory functioning, the results proved this hypothesis as social networking is significantly negatively correlated with memory functioning. In the linear regression the effect of social networking addiction on memory functioning is also predicted negative. One of the studies shows that the social media addiction is correlated negatively with cognitive function or memory when an individual has a higher-than-average social media usage which indicates higher social media addiction and lower cognitive function or memory (Hashem & Muda, 2020). Another study says that short term memory is significantly and negatively correlated with internet addiction (Hashem & Muda, 2020). The cultural relevance of social networking addiction's impact on memory functioning is crucial because the intensity and nature of social media use differ significantly across societies, thereby influencing cognitive effects. In cultures where social networking is deeply woven into both personal and professional life, the detrimental impact on memory functioning tends to be more severe compared to cultures with less pervasive social media usage (Stănculescu & Griffiths, 2022; Zhou et al., 2021). Research has shown that social networking addiction can negatively affect memory functioning, and

this relationship can differ based on cultural contexts. For example, in cultures with high social media engagement, individuals might experience more pronounced cognitive impacts due to increased distractions (Kuss & Griffiths, 2011).

Second hypothesis says that there is positive relationship between social networking addiction and aggression the results are in the favor of this hypothesis as there is significantly positive correlation between social networking addiction and aggression. In the linear regression the effect of social networking addiction on aggression is also predicted positive. A study shows that Aggression may arouse by social media use (Brown & Bobkowski, 2011). Another study revealed that by using social media for academic purpose students waste their precious time in online gaming, shopping, and entertainment. So, their behavior diverts them from learning process and it affects them and causes an unfortunate academic performance (Yu et al., 2010). As the sample was university students so this excessive use of social media automatically fills them up with the feelings of guilt of not studying well which changes into aggression gradually. Another study shows that too much usage of social media is linked to aggression (Ko et al., 2009).

A study highlights that in cultures with high social media use, individuals might experience increased frustration and aggression due to constant online interactions and the pressures of maintaining a certain online persona. This effect can be more pronounced in individualistic cultures where personal expression and competition are highly valued (Wang et al., 2020).

A study found that in East Asian cultures, where there is a strong emphasis on collectivism and social harmony, social networking addiction also correlates with aggression, though the nature of the aggression might be more indirect or passive compared to the more overt aggression seen in Western cultures (Kim et al., 2017).

According to third hypothesis sleep quality plays a mediating role between social networking addiction and memory functioning, the findings revealed that there is negative relation between sleep quality and memory functioning. As the scale of Sleep Quality that is used in the study as an instrument mostly contain those items which measures poor sleep, so here we will consider the Sleep Quality as poor sleep quality, so there is negative correlation between poor sleep quality and memory functioning. In a study it is stated that Cognitive performance can badly affect by sleep loss, for example it causes less sustained attention and reduces memory functioning (Maquet, 2001). Another study said that prospective memory tasks are executed far better than

"bad" sleepers, in "good" sleepers according to previous studies (Fabbri et al., 2014). One of the studies says that poor sleep quality has been linked in longitudinal studies to eventual cognitive loss (Potvin et al., 2012).

According to fourth hypothesis sleep quality plays a mediating role between social networking addiction and aggression, the findings revealed that there is positive relation in poor sleep quality and aggression. According to the studies, anger and other psychological act linked to shortage of reduced sleep and it also belongings to person's violent behaviors and capacity toward accurately control their sensation (Baglioni et al., 2010). Another study says that Emotional function may also affect by sleep loss (Walker et al., 2009). Moreover, in one study it is stated that the raise of irritation, emotional and passionate reaction aspect in human being is linked with the lack of sleep (Kamphuis et al., 2012). Other Studies shows that aggression and sleep quality are reversible, poor sleep is directly proportional to aggression (Kamphuis et al., 2014).

Fifth hypothesis stated that, Male university students are higher at social networking addiction than female university students but the results show no any significant difference between male and female social networking addiction. In a study it is explained that in the previous ten years, scrolling or checking the social media websites have become one of the most popular activities. No doubt, most of the usage is not problematic but some people are not only engaged in excessive use but are also addicted to social media platforms. According to psychologists, about 5 to 10% of Americans are social media addicts (Hilliard, 2019). The study on students proved that students broadly use social media apps and sites on which they spend most of their time. Based on researches, it was known that university students use the most social media as compared to the other students of various age groups (Azizi et al., 2019).

According to sixth hypothesis Male university students are higher at aggression than female university students but the results oppose the hypothesis because the results shows that actually females are higher at aggression than male university students. In various studies it is reported widely that men tend to show physical, direct and overt aggression and women tend to show indirect and relational aggression, as in the study the aggression we consider arise indirectly for instance due to poor sleep quality or due to excessive use of social sites which makes person irritable and a person may feel difficulty in daily tasks that's why female university students scored higher in aggression than male university students. The other reason can be hormones females

who have high amount of testosterone and low cortisol show heightened aggression.

Limitations and Suggestions

The research is only conducted on undergraduate students, so the data provide the results only about undergraduate university students. Due to the nature of study sample, it cannot be generalized. In this study the data is only collected from Islamabad, Rawalpindi, Lahore, Wah Cantt, Haripur and Peshawar. It can be collected on large scale from different universities of different cities across Pakistan. This study can be conducted on large sample size. It is suggested for future studies that the correlation between Memory Functioning and Aggression can be calculated through different conceptual framework.

Implications

The practical implication of the research is that it is implicated in the educational institutions and various seminars can be conducted on the topic for the awareness purpose. The theoretical implication is that the future researchers will use this research for conducting further studies regarding this domain.

References

Adoasi, A. (2015). Social media addiction among students of the University of Ghana. *University of Ghana*. https://ugspace.ug.edu.gh/.

Adrendain, Jonathan, & Murcia, Vianne, J. (2016). *Facebook addiction and aggression: Is there a profound relation?* https://mpra.ub.uni-muenchen.de/72171/

Alabi, G. (2012). Understanding the relationship among leadership effectiveness, Leader-Member interactions and organizational citizenship behaviour in higher institutions of learning in Ghana. *Journal of International Education Research (JIER)*, *8*(3), 263-278. https://doi.org/10.19030/jier.v8i3.7108

Azizi, S. M., Soroush, A., & Khatony, A. (2019). The relationship between social networking addiction and academic performance in Iranian students of medical sciences: A cross-sectional study. *BMC Psycho*, *17*, 28. https://doi.org/10.1186/s40359-019-0305-0

Bagley, E. J., Kelly, R. J., Buckhalt, J. A., & El-Sheikh, M. (2015). What keeps low-SES children from sleeping well: The role of pre-sleep worries and sleep environment. *Sleep Medicine*, *16*(4), 496-502. https://doi.org/10.1016/j.sleep.2014.10.008

Baglioni, C., Nanovska, S., Regen, W., Spiegelhalder, K., Feige, B., Nissen, C., Reynolds, C. F., & Riemann, D. (2016). Sleep and mental disorders: A meta-analysis of polysomnographic research. *Psychological Bulletin*, *142*(9), 969-990. https://doi.org/10.1037/bul0000053

Baglioni, C., Spiegelhalder, K., Lombardo, C., & Riemann, D. (2010) Sleep and Emotions: A Focus on Insomnia. Sleep Medicine Reviews, 14, 227-238. https://doi.org/10.1016/j.smrv.2009.10.007

Barker, L. F., Ireland, J. L., Chu, S., & Ireland, C. A. (2016). Sleep and its association with aggression among prisoners: Quantity or quality? *International Journal of Law and Psychiatry*, *47*, 115-121. https://doi.org/10.1016/j.ijlp.2016.02.014

Birkley, E. L., & Eckhardt, C. I. (2015). Anger, hostility, internalizing negative emotions, and intimate partner violence perpetration: A meta-analytic review. *Clinical Psychology Review*, *37*, 40-56. https://doi.org/10.1016/j.cpr.2015.01.002

Brown, J. D., & Bobkowski, P. S. (2011). Older and newer media: Patterns of use and effects on adolescents' health and well-being. *Journal of Research on Adolescence*, *21*(1), 95-113. https://doi.org/10.1111/j.1532-7795.2010.00717.x

Buboltz, W. C., Loveland, J. M., Jenkins, S. M., Brown, F. C., Soper, B., & Hodges, J. (2006). College student sleep: Relationship to health and academic performance. *College Students: Mental Health and Coping Strategies*, 1-39. https://psycnet.apa.org/record/2006-09656-001

Bulck, J. (2004). Media Use and Dreaming: The Relationship Among Television Viewing, Computer Game Play, and Nightmares or Pleasant Dreams. *Dreaming*, *14*(1), 43-49. https://doi.org/10.1037/1053-0797.14.1.43

Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, *63*(3), 452-459. https://doi.org/10.1037/0022-3514.63.3.452

Driscoll, H. C., Serody, L., Patrick, S., Maurer, J., Bensasi, S., Houck, P. R., Mazumdar, S., Nofzinger, E. A., Bell, B., Nebes, R. D., Miller, M. D., & Reynolds, C. F. (2008). Sleeping well, aging well: A descriptive and cross-sectional study of sleep in "successful agers" 75 and older. *The American Journal of Geriatric Psychiatry*, *16*(1), 74-82. https://doi.org/10.1097/jgp.0b013e3181557b69

Fabbri, M., Filardi, M., Martoni, M., & Natale, V. Tonetti, L. (2014). Effects of sleep timing, sleep quality and sleep duration on school achievement in adolescents. *Sleep Medicine*, *16*(8), 936-940. https://doi.org/10.1016/j.sleep.2015.03.026

Finan, P. H., Goodin, B. R., & Smith, M. T. (2013). The association of sleep and pain: An update and a path forward. *The Journal of Pain*, *14*(12), 1539-1552. https://doi.org/10.1016/j.jpain.2013.08.007

Greene, E. T., Lipizzi, E. L., Conrad, A. K., Kamimori, G. H., & Killgore, W. D. (2006). Sleep deprivation adversely affects interpersonal responses to frustration. *Personality and Individual Differences*, *41*(8), 1433-1443. https://doi.org/10.1016/j.paid.2006.06.002

Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance use, 10*(4), 191-197.

Gunnarsdottir, K. M. (2014, May 1). *Effects of poor subjective sleep quality on symptoms of depression and anxiety among adolescents*. https://www.semanticscholar.org/paper/Effects-of-Poor-Subjective-Sleep-Quality-on-of-andGunnarsdottir/23a37a4afef5508c09c64beebb18e3e34f 7c5ecb

Hashem, S. W. M. A., & Muda, T. E. A. T. (2020). A review of social media addiction, self-esteem, mental health, cognitive functions/memory and emotional intelligence. *International Journal of Social Science Research*, *2*(1), 28-34.

Hashem, S., & Muda, T. (2020). A review of social media addiction, self-esteem, mental health, cognitive functions/memory and emotional intelligence. *International Journal of Social Science Research*, *2*(1), 28-34.

Hilliard, J. (2019). Social media addiction -addiction center. https://www.addictioncenter.com/drugs/social-media-addiction/

James, J. E., & Gregg, M. E. (2004). Effects of dietary caffeine on mood when rested and sleep restricted. *Human Psychopharmacology: Clinical and Experimental*, *19*(5), 333-341. https://doi.org/10.1002/hup.589

Kamphuis, J., Dijk, D. J., Spreen, M., & Lancel, M. (2014). The relation between poor sleep, impulsivity and aggression in forensic psychiatric patients. *Physiology and Behavior, 123,* 168-173. https://doi.org/10.1016/j.physbeh.2013.10.015

Kamphuis, J., Meerlo, P., Koolhaas, J. M., & Lancel, M. (2012). Poor sleep as a potential causal factor in aggression and violence. *Sleep Medicine*, *13*(4), 327-334. https://doi.org/10.1016/j.sleep.2011.12.006

Kassabri, M., Benbenishty, R., Avi Astor, R., & Zeira, A. (2004). The contributions of community, family, and school variables to student victimization. *American Journal of Community Psychology*, *34*(3-4), 187-204. https://doi.org/10.1007/s10464-004-7414-4

Kim, D. H., Lee, H., & Kwak, J. (2017). Standards as a driving force that influences emerging technological trajectories in the converging world of the Internet and things: An investigation of the M2M/IoT patent network. *Research Policy*, *46*(7), 1234-1254. https://doi.org/10.1016/j.respol.2017.05.008

Ko, C. H., Yen, J. Y., Chen, C. S., Yeh, Y. C., & Yen, C. F. (2009). Predictive values of psychiatric symptoms for internet addiction in adolescents. *Archives of Pediatrics &Amp; Adolescent Medicine*, *163*(10), 937. https://doi.org/10.1001/archpediatrics.2009.159

Kuss, D. J., & Griffiths, M. D. (2011). Internet gaming addiction: A systematic review of empirical research. *International Journal of Mental Health and Addiction, 10*(2), 278-296. https://doi.org/10.1007/s11469-011-9318-5

Maquet, P. (2001). The role of sleep in learning and memory. *Science, 294*(5544), 1048-1052.

Myers, D. G. (2015). *Exploring Social Psychology. 7th Edition, McGraw-Hill Education, New York. - References - Scientific Research Publishing. (n.d.). https://www.scirp.org/reference/referencespapers?referenceid=2129207.*

Natale, V., Fabbri, M., Tonetti, L., & Martoni, M. (2014). Psychometric goodness of the mini sleep questionnaire. *Psychiatry and Clinical Neurosciences, 68*(7), 568-573.

O'Brien, R., & Fiederer, S. (2009). Quality and Machine Translation A Realistic Objective. *The Journal of Specialised Translation*, *11*, 52-74. References - Scientific Research Publishing. (n.d.). https://www.scirp.org/reference/referencespapers?referenceid=2839621

Oluwole, M., Folaranmi, L., & Alabi, A. (2013). A survey of facebook addiction level among selected nigerian university undergraduates. *New Media and Mass Communication*, *10*, 70-80.

Otu, A. A. (2015). *Social media addiction among students of the University of Ghana* (Doctoral dissertation, University of Ghana).

Pantic, I. (2014). Online social networking and mental health. *Cyber psychology, Behavior and Social Networking*, *17*(10), 652-657.

Paruthi, S., Brooks, L. J., D'Ambrosio, C., Hall, W. A., Kotagal, S., Lloyd, R. M., Malow, B. A., Maski, K., Nichols, C., Quan, S. F., Rosen, C. L., Troester, M. M., & Wise, M. S. (2016). Recommended amount of sleep for pediatric populations: A consensus statement of the american academy of sleep medicine. *Journal of Clinical Sleep Medicine*, *12*(06), 785-786. . https://doi.org/10.5664/jcsm.5866

Pot-vin, O., Lorraine, D., Forget, H., Dude, M., Grenier, S., Preville, M., Hudon, C. (2012). Sleep quality and 1-year incident cognitive impairment in community-dwelling older adults. *Sleep, 35*(4), 491-499.

Punamäki, R., Wallenius, M., Nygård, C., Saarni, L., & Rimpelä, A. (2007). Use of information and communication technology (ICT) and perceived health in adolescence: The role of sleeping habits and waking-time tiredness. *Journal of Adolescence*, *30*(4), 569-585. https://doi.org/10.1016/j.adolescence.2006.07.004

Rau, J., Münch, F. V., & Asli, M. (2021). Social Media Research Assessment Template for Ethical Scholarship (SOCRATES): Your politely asking data ethics guide. https://leibniz-hbi.github.io/socrates.

Sampasa-Kanyinga, H., & Lewis, R. F. (2015). Frequent use of social networking sites is associated with poor psychological functioning among children and adolescents. *Cyber psychology, Behavior, and*

Social Networking, *18*(7), 380-385. https://doi.org/10.1089/cyber.2015.0055

Scheer, F. A. J. L., Hilton, M. F., Mantzoros, C. S., & Shea, S. A. (2009). Adverse metabolic and cardiovascular consequences of circadian misalignment. *Proceedings of the National Academy of Sciences*, *106*(11), 4453-458. https://doi.org/10.1073/pnas.0808180106

Stănculescu, E., & Griffiths, M. D. (2022). Social media addiction profiles and their antecedents using latent profile analysis: The contribution of social anxiety, gender, and age. *Telematics and Informatics*, *74*, 101879. https://doi.org/10.1016/j.tele.2022.101879

Swain, R. K., & Pati, A. K. (2019). Use of social networking sites (SNSs) and its repercussions on sleep quality, psychosocial behavior, academic performance and circadian rhythm of humans – a brief review. *Biological Rhythm Research*, *52*(8), 1139-1178. https://doi.org/10.1080/09291016.2019.1620487

Taub, J. M. (1977). Behavioral and psychological correlates of a difference in chronic sleep duration. *Biol Psychol*, *5*(1), 29-45.

Troyer, A. K., & Rich, J. B. (2002). Psychometric properties of a new metamemory questionnaire for older adults. *The Journals of Gerontology Series B*, *57*(1), P19-P27. https://doi.org/10.1093/geronb/57.1.P19

Vaughn, B. E., Elmore-Staton, L., Shin, N., & El-Sheikh, M. (2015). Sleep as a support for social competence, peer relations, and cognitive functioning in preschool children. *Behavioral Sleep Medicine*, *13*(2), 92-106. https://doi.org/10.1080/15402002.2013.845778

Walker, M. P., & van der Helm, E. (2009). Overnight therapy? The role of sleep in emotional brain processing. *Psychological Bulletin*, *135*(5), 731-748. https://doi.org/10.1037/a0016570

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., McIntyre, R. S., Choo, F. N., Tran, B., Ho, R., Sharma, V. K., & Ho, C. (2020). A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behavior and Immunity*, *87*, 40-48. https://doi.org/10.1016/j.bbi.2020.04.028

Waters, F., & Bucks, R. S. (2011). Neuropsychological effects of sleep loss: Implication for neuropsychologists. *Journal of the International Neuropsychological Society*, *17*(4), 571-586. https://doi.org/10.1017/s1355617711000610

Wolniczak, I., Cáceres-DelAguila, J. A., Palma-Ardiles, G., Arroyo, K. J., Solís-Visscher, R., Paredes-Yauri, S., Mego-Aquije, K., & Bernabe-Ortiz, A. (2013). Association between facebook dependence and poor sleep quality: A study in a sample of undergraduate students in peru. *PLoS ONE*, *8*(3), e59087. https://doi.org/10.1371/journal.pone.0059087

Xanidis., Catherine, M., & Brignell, F. (2016). The association between the use of social network sites. *Sleep Quality and Cognitive Function During the Day*, *54*(8), 122-125.

Xu, H., & Tan, B. C. Y. (2012). Why do i keep checking facebook: Effects of message characteristics on the formation of social network services addiction. *International Conference on Information Systems*. https://aisel. aisnet.org/cgi/viewcontent.cgi?article=1216&context=icis2012

Yen, J. Y., Ko, C. H., Yen, C. F., Chen, S. H., Chung, W. L., & Chen, C. C. (2008). Psychiatric symptoms in adolescents with Internet addiction: Comparison with substance use. *Psychiatry and Clinical Neurosciences*, *62*(1), 9-16. https://doi.org/10.1111/j.1440-1819.2007.01770.x

Yi, M. Y., Jackson, J. D., Park, J. S., & Probst, J. C. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. *Information & Management*, *43*(3), 350-363. https://doi.org/10.1016/j.im.2005.08.006

Yu, A. Y., Tian, S. W., Vogel, D., & Kwok, R. C. W. (2010). Can learning be virtually boosted? An investigation of online social networking impacts. *Computers & education*, *55*(4), 1494-1503.

Zhou, C., Xiu, H., Wang, Y., & Yu, X. (2021). Characterizing the dissemination of misinformation on social media in health emergencies: An empirical study based on COVID-19. *Information Processing & Management*, *58*(4), 102554.

Received 25 January 2023

Revision received 13 September 2024