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Effect of Excessive Use of Cell Phones on Students' Academic Achievement with a Mediating Role of Sleep Quality

Abstract

The present study aims to investigate the effect of excessive cell phone use on students' academic achievement with a mediating role on sleep quality. This study's statistical population comprises 392 first- and ninth-grade female students from Amol. According to the Krejcie Morgan table, a sample size of 194 persons was computed. In addition, a basic random sampling approach was applied. Standard questionnaires adapted from Hay (2009) and a sleep quality questionnaire designed by Petersburg (1989) were used as assessment methods. Additionally, the grade point average of high school students in the first semester of the academic year 2018-19 was utilized to assess academic achievement. Face validity was employed under the observation of supervisors and consultants to assess the questionnaire's validity. The reliability coefficients of excessive use of cell phones, sleep quality, and academic accomplishment was 0.75, 0.79, and 0.80, respectively, and all variables had a value larger than 0.7, confirming the reliability. The study hypotheses were tested using structural equation modeling and SmartPLS2 software. The results indicated that excessive use of cell phones has an effect on students' academic achievement with a mediating role on sleep quality; excessive cell phone use affects students' academic achievement; excessive cell phone use affects the quality of students' sleep, and sleep quality affects students' academic achievement.

Keywords: *Excessive cell phone use, sleep quality, academic achievement, Amol*

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Introduction

Researchers are interested in studying the variables related to academic achievement and effective strategies to meet the educational and psycho-social needs of students due to the importance of education and the growing demand from the education system to improve the quality of education and improve the academic achievement of students (Mohebbi Noureddin Vand, Shahini Yilagh, Sharifi, 2014). One of these factors is the quality of sleep, which significantly impacts students' academic performance. Excessive usage of cell phones is one of these reasons. Excessive use of cell phones creates a dependency and in severe situations, compels users to check their phones regularly, resulting in a type of addiction. Poor academic performance is one of the challenges that students, as the most brilliant and intellectual future members of society, may face. Excessive usage of cell phones by students creates emotional reliance on cell phones, which, in addition to high mental workload and lack of focus, results in academic failure (Sadoughi and Mohammad Salehi, 2017).

Computers, the Internet, and cell phones have all had a significant impact on people's lives due to recent technological advancements. Since its fast rise, information and communication technology in general, and cell phones in particular, have found a significant position in human existence (the late 1990s). Parents and children have less fear due to being able to communicate with us via cell phones, which increases their sense of security. Excessive usage of cell phones has been linked to health issues and injuries (Sadoughi and Mohammad Salehi, 2017). One of the issues that high school students may face due to their use of cell phones is a drop in academic achievement. Academic achievement refers to a student's capacity to demonstrate academic achievement in achieving the desired objective (Rezaei Hesar and Vahdat, 2017). Many studies show that excessive use of information and communication technology, such as cell phones, has a detrimental influence on high school and college students' academic ability. Excessive cell phone usage has also been linked to waking up at night and text messaging, leading to less sleep and worse academic accomplishment because adequate sleep is required for good functioning (Majidaei, Kasaei, 2015; Sadoughi and Mohammad Salehi, 2017).

Excessive cell phone use is one issue that might hinder academic achievement. Excessive cell phone use has been linked to various behavioral patterns, including waking up in the middle of the night, text messaging, and emotional connections. Maintaining mental health and balance requires adequate sleep (Chan Chi et al., 2011). Sleep is a vital element of life since it is a dynamic and well-organized biological activity (Fazl Ali and Farshidi, 2016). Sleep is a peaceful and comfortable portion of the human life cycle that is induced by the inactivity of the external senses in humans and animals (Hakim, Ghaedi period, Alavi, 2016).

Sleep quality is a complicated phenomenon that is difficult to define and quantify cognitively, i.e., it cannot be studied in a lab. However, the factors influencing sleep quality and their relevance may range from person to person (Dehdari, Taati, and Chaboksavar, 2016). Mental markers and how the sleep experience is experienced, such as sleep contentment and post-sleep feeling, impact sleep quality (Dwald et al., 2010). Sleep

deprivation causes tiredness throughout the day, mood changes, and an increased risk of harmful behaviors such as drug use (Taylor and Bramut, 2010). Learning, memory, and various cognitive functions are all affected by sleep quality and amount, particularly in activities involving new knowledge and skills in educational contexts. Sleep disturbances can worsen mental illnesses, impair overall health, impair cognitive function, cause learning impairments, weariness, make it difficult to do job and study duties, and cause physical pain, all of which can lower a person's quality of life (Haddavandi et al., 2014). As a result, ensuring that children get the proper amount of sleep for academic achievement has become one of the most significant difficulties facing parents and schools today. A variety of factors influence students' sleep quality and, as a result, their academic performance. According to research, poor sleep quality, late sleep, getting up early, and inconsistent sleep at night have been proven to have a significant impact on learning capacity, academic performance, and behavioral-neurological practices (Modarressi Faghihinia, Akbari and Rashti, 2012).

The research's main problem is that parents, families, and educational systems are constantly confronted with hurdles and problems in this area despite the harmful impacts of cell phone usage on children's academic achievement and sleep quality. It is one of their current worries, and despite its relevance and seriousness, the problem and appropriate remedies have yet to be addressed. So far, no study has looked at each of these characteristics independently and separately among high school students, or if it has, it has only looked at a small portion of them, and there are still many hurdles in this field, which is one of the issues. It has been ingrained in the lives of families and educational systems, and kids continue to overuse their cell phones, jeopardizing their academic performance and causing sleeplessness as a result of the scarcity of research in this sector and the difficulties that it presents. This issue still exists in today's educational system, and no action has been made to limit students' excessive use of cell phones or sleep control by parents, families, or educational institutions. Considering the importance of these factors and the role they can play in students' academic achievement, this research aims to make an effort to take a step toward improving this situation and providing the necessary solutions, and by doing so, you can contribute to this tortuous path of education. Accordingly, the primary goal of this study is to investigate the impact of excessive cell phone usage on students' academic progress, as well as the function of sleep quality as a mediating factor among female high school students in Amol.

Method

The current research is a form of descriptive-applied research and survey. The study's statistical population consists of 392 first-year high school students from non-governmental girls' schools in Amol. The current study's sample is calculated using the Krejcie Morgan table and the statistical populations. This table was used to generate a sample size of 194 persons. Data was collected using a questionnaire and a field approach. The current study questionnaire comprises questions about three research variables: cell phone misuse, sleep quality, and academic accomplishment, and it has a total of 27 questions, as shown in Table 1 below:

Table 1. Research questionnaire

Variables	**Dimensions**	**Number of questions**	**Source**
Excessive use of cell phones	Tolerance of deprivation	4	Hy (2009)
	Life dysfunction	3	Hy (2009)
	Coercion-Insistence	3	Hy (2009)
Sleep quality	Delay in falling asleep	3	PSQI (1989)
	Sleep duration	3	PSQI (1989)
	Sleep efficiency	3	PSQI (1989)
	Sleep disturbances	8	PSQI (1989)
	hypnotic drugs	1	PSQI (1989)
	Daily functional disorders	2	PSQI (1989)
Academic achievement	The grade point average of high school students in the first semester of the academic year 2018-19 was used to assess academic achievement.		

We sought to employ standard questionnaires used by previous researchers in this study to strengthen the validity of the questionnaire. Thus, the survey has content validity. The questionnaire was authorized and amended based on the recommendations of academics, specialists, and researchers for face validity. The reliability of the questionnaire used in

this study was determined using Cronbach's alpha criteria. Cronbach's alpha was computed using SPSS software in this study. To evaluate the questionnaire's dependability, the first 35 questionnaires were issued for pre-testing, and all 35 questionnaires were collected in their entirety. The questions have been tweaked at this point to make them easier to comprehend. The amended questionnaire was then given to the whole study group. Table (2) details the dependability of each of these two steps:

Table 2. Cronbach's alpha coefficient

Variable	Number of questions	Cronbach's alpha	Pretest	Cronbach's alpha	Number of samples
Excessive use of cell phone	10	0.736	35	0.753	194
Sleep quality	20	0.709	35	0.793	194
Academic achievement	-	0.781	35	0.801	194

Because the acceptable value for this criteria is more than or equal to 0.7 (Cronbach, 1951), all study structures have good reliability, as indicated in Table (2). In addition, the questionnaire's overall reliability was 0.89, indicating that the questionnaire's whole reliability had been confirmed.

Bartlett test results to evaluate the adequacy of the sample

The Bartlett test is used to assess the sample size's adequacy. In other words, we will determine if the number of statistical samples used in this study is sufficient to test the research hypotheses by calculating the amount of the test or not (Mo'meni, 1989).

The following is a list of the test's results (Zare and Chahouki, 2010):

Inadequate data = less than 0.5
Poor fit = between 0.5 to 0.59
Average proportion = between 0.60 and 0.69
Good fit = between 0.70 and 0.79
Very good fit = between 0.80 and 0.89
Excellent fit = more than 0.90

The results of the current study's data may be seen in Table 3 below, which shows the Bartlett test value. As a result, the chosen sample meets the criteria for the current study.

Table 3. The results of sample KMO results

KMO test of sample adequacy scale 0.81	
Bartlett's test of sphericity	Chi-square 246/598 Degree of freedom 3 Significance level 0.000

The research was carried out using structural equation modeling software and SMSRTPLS2 software to analyze the data and evaluate the hypotheses.

Findings

Descriptive statistics of research variables include standard deviation and mean indicators, the results of which are as follows:

Table 4. Descriptive statistics of research variables

Research variables	Number of samples	Maximum	Minimum	Mean	Standard deviation
Excessive use of cell phone	194	5	1	3.65	1.06
Sleep quality	194	5	1	3.51	0.761
Academic achievement	194	5	1	3.68	1.22

As shown, the mean of all research variables is more than the crucial value of 3, and the standard deviation values are less than 2, indicating that there are no outliers, confirming the descriptive statistics of the research variables.

SPSS20 software and the Kolmogorov-Smirnov test were used to assess the claim of normality of study variables and obtained data. The data does not follow the normal distribution for this purpose, regardless of how significant the value is less than 0.05. As previously stated, α refers to the researcher's tolerance for error, which is normally set at 5%. Because the significance value for all variables using the Kolmogorov-Smirnov test is less than 0.05, the assumption that the data distribution is abnormal can be validated, and the data do not have a normal distribution can be declared. As a result, SmartPLS2 software was utilized to examine and analyze the data in this study. To evaluate the reliability, three criteria of factor loading

coefficient, Cronbach's alpha, and compositional reliability were used.

A. Factor load coefficients: Factor loads are estimated by computing the correlation value of a structure's characteristics with that structure, which, if equal to or more than 0.4, shows the measurement model's acceptable dependability (Hulland, 1999). The indices (questionnaire questions) should be adjusted or eliminated from the research model if the factor loads between the structure and its indices are less than 0.4. Table 1 shows the values of the research metrics' factor loads (5).

Table 5. The number of factor loads of research metrics

Research variables	Dimensions of each variable	Questions	Factor load
Excessive use of cell phone	Tolerance of deprivation	TD1	0.88
		TD2	0.87
		TD3	0.86
		TD4	0.84
	Life dysfunction	LPD5	0.88
		LPD6	0.88
		LPD7	0.87
	Coercion-Insistence	CAI8	0.86
		CAI9	0.89
		CAI10	0.82
Sleep quality	Delayed sleep	DA11	0.82
		DA12	0.84
		DA13	0.85
	Sleep duration	ST14	0.81
		ST15	0.79
		ST16	0.82
	Sleep efficiency	SE17	0.77
		SE18	0.85
		SE19	0.69
	sleep disorders	SD20	0.62
		SD21	0.74
		SD22	0.78
		SD23	0.76
		SD24	0.72
		SD25	0.70
		SD26	0.65
		SD27	0.57
	hypnotic drugs	SJ28	1.000
	Daily functional disorders	DOD29	0.90
		DOD30	0.93
Academic achievement		AA	1.000

Table 5 shows that the factor load coefficients for all questions are more than 0.4, indicating that the sample has satisfactory reliability.

B) Cronbach's alpha and compositional reliability: After measuring the factor loads of the questions, the data analysis algorithm in the SmartPLS technique calculates and reports the Cronbach's alpha coefficient and the compositional reliability of the structures. Cronbach's alpha is a well-known and acceptable indicator of internal stability in reliability analysis. Internal reliability indicates the degree of connection between a structure and its related indicators. Cronbach's alpha should be larger than or equal to 0.7. Composite reliability (CR) is a different criterion for calculating reliability. Both of these criteria are used to assess the dependability of a system. A number greater than 0.7 has been determined for composite

reliability (Nunnally, 1987). Table 4-9 shows the results of these two criteria.

C) Convergent validity: The fit of convergent validity measurement models is the second criteria, which evaluates the degree of connection between each structure and its questions (indicators). SmartPLS software employs the AVE criteria for this purpose. When the value of all standardized factor loads related to each measurement variable and the value of AVE associated with each of the latent variables is more than 0.5, convergent validity is proven. Table 4-8 displays these figures.

Table 6. Cronbach's alpha, compositional reliability, convergent validity

Latent variables	**Title in the model**	**Cronbach's alpha coefficient (Alpha ≥ 0.7)**	**The compositional reliability coefficient (CR ≥ 0.7)**	**Mean extraction varianceAVE≥0/5)**
Excessive use of cell phone	UMP	0.94	0.95	0.67
Deprivation tolerable	TD	0.88	0.92	0.75
Life dysfunction	LPD	0.86	0.91	0.78
Coercion-Insistence	CAI	0.82	0.89	0.74
Sleep quality	SQ	0.91	0.92	0.57
Delayed sleep	DA	0.79	0.88	0.71
sleep disorders	SD	0.85	0.88	0.51
hypnotic drugs	SJ	1.000	1.000	1.000
Daily functional disorders	DOD	0.82	0.91	0.84
Sleep efficiency	SE	0.76	0.81	0.60
Sleep duration	ST	0.74	0.85	0.66
Academic achievement	AA	1.000	1.000	1.000

Considering that Cronbach's alpha should be 0.7, composite reliability should be 0.7, and AVE should be 0.5, the findings in Table 6 demonstrate that all of these criteria have been properly applied to latent variables, validating the status of convergent reliability and validity.

D) Divergent validity: Another criterion for testing the fit of a measurement model is divergent validity, which may be done in two ways. The Fornell-Larker criteria are used to assess divergent validity by comparing the correlation of a structure with its features to the correlation of that structure with other structures (Table 7).

Table 7. Correlations between latent variables and AVE values

	AA	**CAI**	**DA**	**DOD**	**LP**	**SD**	**SE**	**SJ**	**SQ**	**ST**	**TD**	**UMP**
AA	1											
CAI	0.23	0.86										
DA	0.87	0.85	0.84									
DOD	0.82	0.81	0.80	0.91								
LP	0.46	0.83	0.81	0.90	0.88							
SD	0.59	0.80	0.82	0.89	0.85	0.71						
SE	0.81	0.75	0.79	0.73	0.81	0.70	0.77					
SJ	0.91	0.83	0.83	0.81	0.86	0.70	0.75	1				
SQ	0.83	0.84	0.80	0.75	0.82	0.66	0.70	0.82	0.75			
ST	0.75	0.82	0.77	0.83	0.85	0.71	0.76	0.80	0.73	0.81		
TD	0.76	0.81	0.82	0.81	0.81	0.70	0.71	0.75	0.71	0.80	0.86	
UMP	0.79	0.83	0.81	0.76	0.86	0.62	0.72	0.73	0.74	0.79	0.85	0.81

The Fornell-Larker criteria may be used to determine the divergent validity of the model at the structural level based on the correlations and the square root of AVE, which is put on the diameter of Table 7.

A) Significance coefficients [1] (t-value): The significant numbers t are the most basic requirement for determining the relationship between structures in the model (structural portion). If significant numbers surpass 1.96, the relationship between structures and hypotheses is verified. The degree of confidence for this verification is 95 percent. When this criterion is examined, it is discovered that all t-values are larger than 1.96, indicating that all measurements and correlations between structures are significant at the 0.95 confidence level.

B) Determination coefficient (R^2) and forecast power factor (Q^2)

According to research conducted by Chean (1998), the criteria values for the coefficient of determination R^2 are 0.19, 0.33, and 0.67 for weak, medium, and strong values, respectively. All of the model's endogenous variables demonstrate a strong fit to the structural model, according to R^2. In addition, if the values of Q^2 for an endogenous structure are 0.02, 0.15, and 0.35, respectively, they imply weak, medium, and strong values. The value of Q^2 for the structures implies a medium and strong match, according to the results of Q^2.

Table 8. The values of the coefficient of determination and the coefficient of predictive power

	TD	LPD	CAI	SQ	DA	ST	SE	DOD	SD	SJ	AA
R^2	0.91	0.90	0.86	0.35	0.36	0.66	0.60	0.36	0.85	0.40	0.22
Q^2	0.68	0.72	0.63	0.18	0.26	0.43	0.37	0.30	0.42	0.37	0.29

We will examine and assess the primary hypothesis and sub-hypotheses of our research after analyzing the fit of measurement models, structural models, and general models. Table 9 shows the findings of the study hypothesis testing. With a confidence level of 0.95, the hypotheses were rejected and confirmed.

Table 9. Testing the main research hypothesis

	Independent variable	Effect	Dependent variable	Intermediate variable	T statistics	Standard path coefficient	Result
Main hypothesis	Excessive use of cell phone	→	Academic achievement	Sleep quality	12.73	0.57	**Confirmed**
First sub-hypothesis	Excessive use of cell phone	→	Academic achievement	5.02	-0.33	**Confirmed**	**First sub-hypothesis**
Second sub-hypothesis	Excessive use of cell phone	→	Sleep quality	11.02	0.59	**Confirmed**	**Second sub-hypothesis**
Third sub-hypothesis	Sleep quality	→	Academic achievement	7.53	0.46	**Confirmed**	**Third sub-hypothesis**

The Z value for the mediating influence of the sleep quality variable in the relationship between excessive cell phone usage and academic achievement (12.73) is more than 1.96, indicating that the main hypothesis is correct. This variable's impact intensity is also 0.57. This means that the sleep quality variable indirectly mediates 0.57 of the total effect of excessive cell phone usage on academic achievement.

According to the first sub-hypothesis, the T statistic (5.02) implies that this hypothesis is confirmed. Furthermore, according to the standardized coefficient of the relationship between excessive use of cell phones and academic achievement, excessive use of cell phones can explain 0.33 of the changes in the variable of academic achievement in the opposite direction. That is, for every 1% increase in cell phone use, academic achievement will decrease by 0.33 percent in the other direction. The result of the T statistic (11.02) shows that the second sub-hypothesis is confirmed, according to the second sub-hypothesis. Excessive use of cell phones can also explain 0.59 of the variable changes in sleep quality in the other direction, according to the standardized coefficient of the path between excessive use of cell phones and sleep quality. In other words, for every 1% increase in excessive cellphone usage, sleep quality will decrease by 0.59 percent in the other way. According to the third sub-hypothesis, the T statistic (7.53) implies that this hypothesis is confirmed. Furthermore, according to the standardized coefficient of the relationship between sleep quality and academic accomplishment, sleep quality can account for 0.46 of the variations in academic achievement. In other words, a 1% difference in sleep quality will result in a 0.46 percent change in academic attainment.

[1] Significant coefficient values (t-value) have been considered 1.96 that if the value of t-statistic is more than 1.96, it indicates the confirmation of the hypothesis and if it is less than 1.96, the hypothesis of the research will not be confirmed.

Discussion

The present study aimed to "explore the effect of excessive cell phone usage on academic achievement with the mediation function of students' sleep quality (Case study: female high school students in non-government schools in Amol city)." The results of correlation analysis support the primary hypothesis, which assessed the influence of cell phone use on students' academic achievement with the mediating function of sleep quality as a mediating factor. The findings of this theory match those of Sadoughi and Mohammad Salehi (2017), Fazl Ali, and Farshidi (2016). Sleep deprivation leads to tiredness and excessive daily sleepiness, which affects cognitive function and academic performance, and sleep deprivation leads to weariness and excessive daily drowsiness, which reduces cognitive function and academic achievement. Poor sleep habits harm students' attentiveness, problem-solving abilities, and academic achievement. Talking on a cell phone, using e-mail, utilizing instant messaging services, using social media, and surfing the Internet are all cited as major causes of sleep deprivation and classroom delays by students. Cell phone usage at night was linked to poor sleep quality, with students who used their phones for more than two hours experiencing sleep deprivation and daytime tiredness, which can affect their cognitive and learning capacities. Excessive cell phone usage, which has been linked to behavioral patterns like staying up late, appears to be an emotional dependency that builds in users' brains to the point where they think they can't live without their phones. As a result, it has a significant influence on students' sleep quality, growth, and overall performance. Low academic performance implies that the student lacks motivation, while motivation improves the student's spare time. When I have more free time, one of the ways I occupy it is to use my phone, which frequently leads to me going to extremes. Excessive cell phone usage can be a risk factor for poor sleep quality, which can lead to academic dysfunction and a lack of interest in school and learning among adolescents.

The results of correlation analysis support the notion that excessive usage of cell phones has a negative impact on students' academic achievement. Excessive usage of cell phones has a major impact on students' academic achievement, according to T-statistics. This study's findings are consistent with those of Sadoughi and Mohammad Salehi (2017), Safarizadeh Minab and Azami Jafari (2017), Fazl Ali and Farshidi (2016), Sayyah Bargard et al. (2016), Atadokht, Hamidifar, and Mohammadi (2014), Modi and Ramezani (2014), Lee et al. (2015). Excessive usage of cell phones has an impact on students' academic achievement, according to the findings of their study. It may be inferred that students' needless use of cell phones wastes time and that excessive usage of cell phones diminishes students' mental capacity, resulting in less time for studying. This factor may have a negative impact on academic achievement.

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Because of its great capabilities, the cell internet may be an educational tool; nevertheless, instead of engaging in educational activities, students frequently browse irrelevant sites and have less time to study, resulting in their educational decline. The findings of correlation analysis in the research on the effect of excessive cell phone usage on students' sleep quality reveal that this link is confirmed. Excessive usage of cell phones has a considerable impact on students' sleep quality, according to T-statistic data. The results of this research are in line with those of Sadoughi and Mohammad Salehi (2017), Fazl Ali and Farshidi (2015), Majidaei et al. (2015), Lee et al. (2015), and White et al. (2011). The results of their research also showed that excessive use of cell phones affects sleep quality. It is reasonable to conclude that increased hazardous cell phone use is linked to decreased student sleep quality. Sleep may be harmed by the usage of technology. With the rising usage of cell phones throughout the night, an adolescent's reflex response to the sound of cell phones overnight is similar to a mother's reflex response to the sound of her baby screaming, affecting their sleep quality. Cell phone use, such as late-night texting, is incompatible with sleep hygiene recommendations. Excessive cell phone usage is linked to a decrease in overall sleep time. The usage of a cell phone's contents may potentially induce the user to fall asleep later. Furthermore, the stimulating use of cell phones stimulates the brain and alertness, interfering with the sedatives required for sleep, which delays the beginning of sleep. Furthermore, excessive use of cell phones interrupts sleep, which is the leading cause of poor sleep quality and has significant consequences for students' daily activities. Shortwave cell phone light disrupts sleep by inhibiting or delaying the melatonin onset. Watching a cell phone screen before going to bed affects the users' brains and has a detrimental impact on latent sleep, resulting in daytime dysfunction. Students who use cell phones and other forms of information and communication technology often are at a higher risk of developing mental illnesses. Since sleep is one of the most important biological mechanisms for regulating mood, students who have their sleep disrupted as a result of excessive use of these devices are more likely to experience major depressive symptoms like difficulty concentrating, decreased energy, and a reduction in daily sleep time. Furthermore, students with sleep difficulties and negative moods spend time on cell phones and other information and communication devices.

The findings of correlation analysis in the research on the influence of sleep quality on students' academic achievement reveal that this association is confirmed. The T-statistic results

revealed that sleep quality had a substantial impact on students' academic performance. The findings of this study are in line with those of Sadoughi and Mohammad Salehi (2017), Ander et al. (2014), Arberg et al. (2014), Diwald et al. (2014), and others (2010). Their findings also revealed that sleep quality has a substantial impact on students' academic performance. Sleep, it can be deduced, is an important component of a student's physical growth and intellectual achievement. Sleep problems impair students' thinking and life processes, and they will pay less attention in class if they have insomnia, sleep disorders, or daily functioning issues. Short-term sleeplessness is frequently accompanied by anxiety or is a side effect of an anxious event or the anticipation of an anxious encounter (such as an exam or job interview). Sleep is both restorative and balanced. In instructional contexts, memory, learning, and performance are all aided. It involves reducing tension, anxiety, and stress, as well as assisting in the recovery of energy, improved attention, adaption, and pleasure of everyday tasks. Poor sleep quality, on the other hand, causes daily drowsiness, mood swings, increased drug use risk, social and occupational dysfunction, dissatisfaction and inability to continue learning, memory and learning deficits, increased stress and anxiety, decreased quality of life, emotional disorders and thought, poor social communication, the severe decline in academic performance, decreased motivation to start or continue activities, and exacerbation of illnesses and physical conditions.

This study, like all others, has limitations, one of which is that it was done among first-year high school students. Given that the study was limited to ninth-grade girls' schools, caution should be exercised in extrapolating the findings to other organizations and schools. Also, because the researcher referred to schools in various areas of the province for the distribution and collecting of questionnaires throughout a certain period of time, and at varying intervals, the respondents' responses may have been influenced by the time and place disparities. According to the findings of this study, parents should offer cell phones to their children as little as possible, or if they do, they should have the required restrictions over the amount of time they spend using them. They should also pay attention to the quality of their children's sleep and strive to educate their proper sleeping habits. Due to the fast growth of information and communication technology, it is also advised to give education and culture on the correct use of cell phones to teenagers, increasing and updating their information. If your children use a cell phone, parents and schools should encourage them to use numerous educational programs. They should also employ applications that can help students achieve academic achievement in a restricted and regulated time frame; in other words, children should not be allowed to use their phones excessively. Due to students' poor usage of cell phones, it is proposed that school administrators organize educational seminars on how to use cell phones effectively. It is suggested to prevent fencing and fencing in the use of cell phones, based on prior study and existing research, and according to the findings of this research. Even though various circulars have been issued at schools and universities prohibiting the use of cell phones in these settings, we are seeing this mode of communication enter classrooms. As a result of the ineffectiveness of rigorous techniques, it appears that providing the essential training on how to use new technology correctly is successful. Additionally, by holding educational classes, particularly for new students, as well as teaching life skills about the role of sleep in academic performance and identifying some physical, mental, and social problems, make them aware of the importance of quantity and quality, and assist them in changing and improving their lifestyle.

Conflict of interest

The authors of the article declare that in relation to the publication of the presented article, they have completely avoided publishing ethics, including avoiding plagiarism, misbehavior, falsification of data, or double submission and publication, and there are no commercial interests in this regard, and the authors are responsible for They have not received any money for presenting their work.

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