Research Paper

Assessment of Sleep Quality, Depression and Anxiety in Relation to Internet Use among College Students

Barsha Sensua[1]*, Dr. Arunjyoti Baruah[2], Ms. Amina Ahmed[3]

ABSTRACT

Internet is a necessity and irreplaceable part of our daily lives. It became a modern-day tool for education, research, communication, shopping, entertainment and many more. In spite of the widely perceived merits of the internet, there are negative impacts too, especially the over or misuse and the related physical and psychological problems like anxiety, depression, sleep disturbances and many more. The study aims to assess the sleep quality, depression and anxiety in relation to internet use among the college students. A total of 117 college students were selected by using convenient sampling technique. After selection of the sample Young's internet addiction scale, Pittsburgh sleep quality index scale and Depression Anxiety Stress scale was used. Research findings revealed that there was a significant association between sleep quality and length of internet use, level of depression and age, semester of the participant and consultation for excessive internet use, level of anxiety and years of internet use and also shows a significant positive correlation between internet use and depression and anxiety. The current study will help the health professionals and also the parents to understand about the factors associated with internet addiction.

Keywords: *Internet use, Sleep quality, Depression, Anxiety, College students*

Internet is defined as the largest computer network in the world to connect all existing computer network along with connected devices like Smartphone, Tablet, Switches, routers, hubs, and other devices, as well as the computer itself (Puspita RH and Rohedi D, 2018). With the advent of new age smart phones, laptops, computers, tablets, smartwatches etc. the internet is readily accessible to the general population (Nath K, Naskar S, Victor R, 2016)

According to internet and mobile association of India, at the end of financial year 2019, India has 451 million monthly active internet users. India is the second to China in terms of internet users. Nearly 1/3rd of users accessed internet for more than one hour in urban India, where as in rural India, a similar proportion of users accessed internet for 15-30 minutes.

[1]Clinical Instructor, Arya Nursing College, Changsari, Kamrup, Assam, India
[2]Professor cum HOD, Department of Psychiatric Nursing, LGBRIMH, Tezpur, Assam, India
[3]PhD Research Scholar, Department of Psychiatric Nursing, LGBRIMH, Tezpur, Assam, India
*Corresponding Author

The report also stated that the 2/3rd of internet users in India are in the age group of 12-29 years (Ahaskar A, 2019).

The behavioural problems or Internet-related problems have been described in various terms like Internet addiction disorder, pathological internet use (PIU), problematic Internet use, excessive Internet use, Internet dependence, compulsive computer use and virtual addiction (Poli R, 2017). It is usually characterized by excessive or poorly controlled preoccupations, urges or behaviours regarding Internet use that lead to impairment or distress (Rosenberg KP, Feder LC, 2014). This problem is a raising phenomenon affecting people mostly the young adolescents with varying frequency around the world and has produced negative impacts on the academic, relationship, financial, and occupational aspects (Ahmet A, Murat İ, 2011).

It has been seen that the maximum internet users are from adolescents and young age group which is a very important period for the formation of health habits that can affect one's whole life. This group have been identified as a group at heightened risk for development of problematic internet use and may cause psychological disorders, such as depression, anxiety and sleep deprivation (Erceg T, Flander G B, Brezinšćak T, 2018).

Depression manifests as deep sorrow or grief, insomnia, loss of appetite, unpleasant mood, hopelessness, irritability, self-dislike, suicidal tendencies, low self-esteem, low motivation, fear of rejection are commonly observed in depressive people, which may result in frequent use of the internet, and the interactive functions of the internet may lead to internet addiction (Bhat SA, Kawa MH, 2015). Internet addiction and other problematic Internet use behaviours may have significant influence on the sleep-wake schedule, leading to insomnia and other sleep disturbances. In the previous studies, it was found that heavy internet use is associated with insomnia, sleep delays, irregular sleeping patterns and excessive daytime sleepiness which in turn are associated with increased waking-time tiredness (Tan Y, Chen Y, Lu Y, Li L, 2016).

This problems are a raising phenomenon affecting adolescents with varying frequency around the world and has produced negative impacts on the academic, relationship, financial, and occupational aspects of many lives (Ahmet A, Murat İ , 2011). They are the one vulnerable to developing dependence on the Internet, more than other segments of the society. This can be attributed to several factors like: Availability of time; ease of use; unlimited access to the Internet; the psychological and developmental characteristics of young adulthood; limited or no parental supervision. All of these factors make Internet overuse a significant cause of concern for parents and teachers (Karthika S, Kaur A, Saini A et al., 2017)

The report "Internet in India 2017" had estimated that of about 500 million internet users in India in the year 2018, 60% shall be students and youth. The total number of internet users in the country is projected to grow to 666.4 million by the year 2023 (Limaye R, Fotwengel G, 2015).

There is a need to focus on emerging adults who are students mainly to promote safe and healthy internet use behaviours across the life span. They are the vulnerable group to develop Problematic Internet Use due to several psychological and environmental factors associated with college life (Limaye R, Fotwengel G, 2015). So, the current researcher felt the importance to study the effect of internet use on mental health among the adolescents in

northeast India as this could provide valuable insights into the nature of internet usage among college going students and its relationship with their mental health.

Objectives

- To assess the level of internet use, sleep quality, depression and anxiety of the College students.
- To find out the association between the socio demographic variables and sleep quality, depression, anxiety and internet use respectively of the college students.
- To find out the relationship among sleep quality, depression, anxiety and Internet use of the college students.

METHODOLOGY

Sample

The population were the students pursuing graduation course and the sample constituted were 117 graduate students. To attain the sample size, at first the stream was selected through simple random sampling (lottery method) followed by convenient selection of departments and students.

Measures

The measures for data collection were comprised of two sections. In the first section, socio demographic proforma which includes socio demographic data and features of internet usage were obtained. The second section comprised of a standardized internet addiction test scale, Pittsburgh sleep quality index and Depression Anxiety Stress Scale (DASS-21). A brief description of the measures is given below:

- **Socio-demographic proforma**: Socio demographic proforma includes socio demographic data and features of internet usage. The socio demographic data were age, gender, marital status, stream, semester, religion, household income, amount of pocket money receives, source of pocket money, living status, any diagnosed physical or psychiatric illness and use of any substance. The features of internet usage include age at 1st use of internet, years of internet usage, method of using internet, social networking sites used, purpose of using the internet, number of times of log in, length of internet use per day, money spent per month, place of access, any strong desire to use internet and any consultation for excessive internet use.
- **The Internet Addiction Test (IAT):** It is the valid and reliable measure of addictive use of the Internet. The tool was developed by Dr. Kimberly Young in 1998 and is the most common tool used to detect internet addiction. The IAT is a 20-item 5-point Likert scale that measures the severity of self-reported compulsive use of the internet. The score is <50-no internet addiction, 50-79-mild internet addiction and >80-severe internet addiction.
- **PSQI (Pittsburgh sleep quality index)**: It is one of the popular tools for the evaluation of sleep quality developed by Buysse, Reynolds III, Monk, Berman & Kupfer in the year 1989, which measures subjective sleep quality during the preceding 1-month period. It consists of 19 self-rated questions and 5 questions rated by the bed partner which is not applicable when not convenient. The component scores were added to a global PSQI score with a range of 0 to 21, with higher scores indicating worse sleep quality.
- **Depression, anxiety and stress scale (DASS 21):** The DASS is a 42-item self-report inventory that provides scores of three subscales: depression [14-items], anxiety [14-items], and stress [14-items]. Scores for depression, anxiety and stress are calculated

by summing the scores for the relevant items. Each item was rated on a 5-point scale. For depression the ratings were given as follows: Normal 0-9, Mild 10-13, Moderate 14-20, Severe 21-27 and Extremely Severe 28+. For anxiety the ratings were given as follows: Normal 0-7, Mild 8-9, Moderate 10-14, Severe 15-19 and Extremely Severe 20+.

Procedure

Written permission was obtained from the concerned authorities. For data collection, the college was selected purposively and out of all the colleges of Tezpur the researcher had selected Darrang college. The HOD of each of the selected department were contacted to take the consent and fixed the date and time for collecting the data. The subjects who were present on the day of data collection were included in the study. On the day of data collection, the researcher explained the need and purpose of the study and requested for their cooperation. The participants were also explained about the confidentiality and anonymity of the study data. After obtaining the informed consent from the participants, the data collection tools were provided to the participants and necessary explanations were given during the data collection. The total time taken for data collection was around 45 minutes.

Research Findings

The research findings have shown that out of the total participants majority i.e 65% were female and the mean and standard deviation of age were 19.16±1.042 years. All the participants were unmarried. The maximum number of participants i.e 62.4% were studying at 2nd semester and 84.6% of participants were from arts stream. Majority of the participants i.e. 88.9% were from Hindu religion. The household income of the maximum participants i.e 53.8% is >10,000. The amount of pocket money received by the maximum participants i.e 73.5% is <=1000 and all the participants receive pocket money from their parents. Equal number of participants i.e. 48.7% lives with parents and in hostel. All the participants had responded no for use of any substance.

All the participants are using internet. The maximum participants i.e 38.5% were using internet from 2-5 years and the mean and standard deviation of age at 1st use of internet were 15.76±1.654 years. Most of the participants i.e 53% log in to social networking sites for 2-5 times per day. The length of internet use per day is for 2-5 hours for most of the participants i.e 42.7%. The maximum participants i.e 50.4% spends less than 200 rupees per month on internet. Most of the participants i.e 62.4% had experience strong desire to use internet and 13.7% had not taken consultation for excessive internet use whereas 86.3% had not taken any consultation.

Out of all participants for each method of internet use the maximum participants uses smartphones i.e 99.1%. The maximum used social networking site was Whatsapp by 88.0%. The majority of the participants i.e 94.9% use internet for education purpose and the most common location of internet access is residence for 61.5% participants.

Out of all participants 50.4% comes under normal internet use, 39.3% have mild internet addiction and 10.3% have moderate internet addiction. While assessing sleep quality the maximum participant i.e 50.4% had poor sleep quality. While assessing depression the majority of the participants i.e 44.4% were in normal range and while assessing anxiety also the maximum participants i.e 34.2% were in normal range.
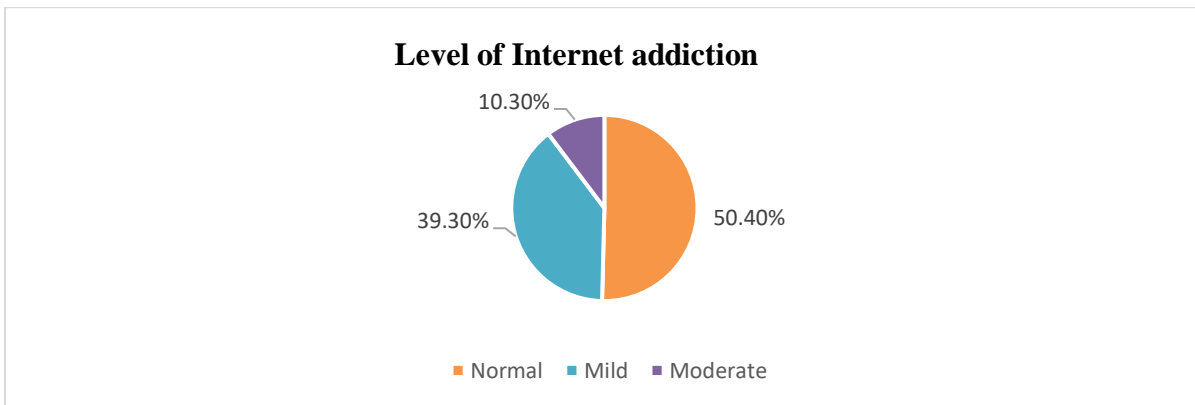
Fig 1: Pie chart showing the percentage distribution of level of internet use

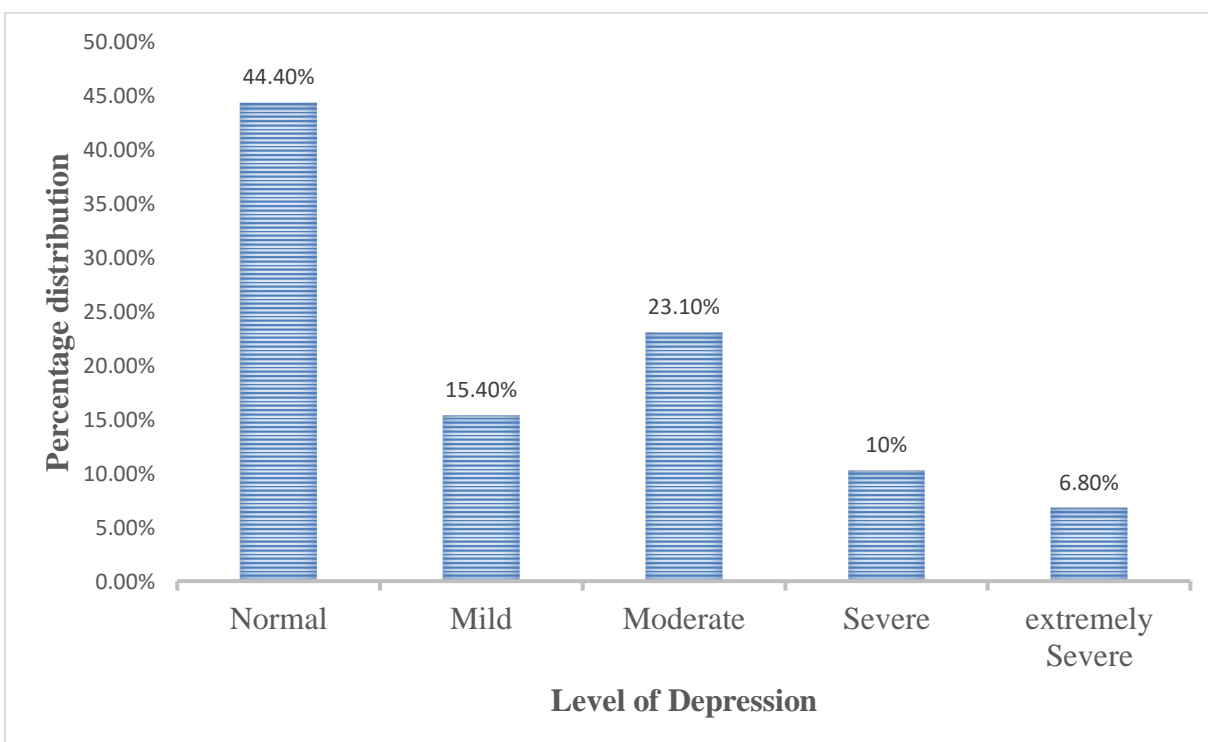*Fig 2: Pie diagram showing percentage distribution of sleep quality*

Fig 3: Bar diagram showing percentage distribution of participants level of depression
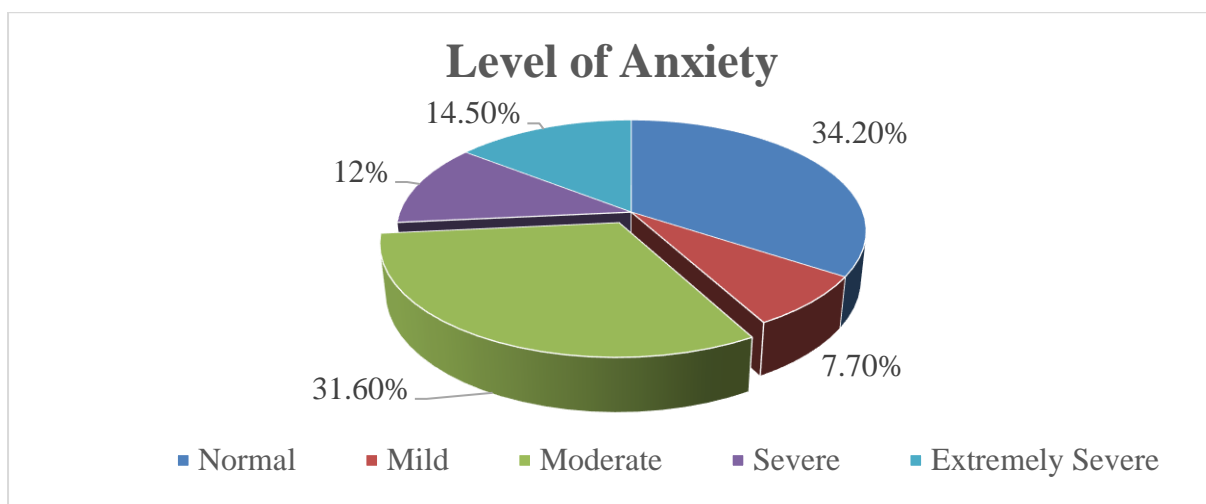
Fig 4: 3D Exploded pie showing percentage distribution of participants level of anxiety

The results also indicate significant association between sleep quality and semester of the participants (χ^2 =6.762, p=0.009) and length of internet use (χ^2 =5.801, p=0.016), level of depression and age (χ^2 =9.497, p=0.023), semester of the participant (χ^2 =8.895, p=0.031) and consultation for excessive internet use (χ^2 =7.421, p=0.046), level of anxiety and semester of participants (χ^2 =9.459, p=0.025) years of internet use (χ^2 =8.859, p=0.028)

Table 1: Correlation between depression, anxiety, sleep quality and Internet use of college students.   n=117

	Internet use		
	r value	p value	S/NS
Depression	0.241	0.009	S*
Anxiety	0.257	0.005	S*
Sleep quality	0.044	0.641	NS

S=significant at the level of 0.05, NS=not significant*

The results also indicate a significant positive correlation between internet use and depression (r=0.241, p=0.009) and internet use and anxiety (r= 0.257, p=0.005) but there was no significant correlation found between internet use and sleep quality.

DISCUSSION
The findings of the present study have been discussed in relation with the objectives of the study and the results of other similar studies under the following headings:

Section I: Discussion of the pattern of internet usage of the participants.
In the present study it was found that the maximum participants i.e 38.5% were using internet from 2-5 years, 31.6% were using for >5 years and 29.9% are using internet for <2 years whereas a study done by Kumar et al (2017) founds that the majority of the students i.e 52.7% reported that they had been using internet since 3 to 5 years, 17.3% reported that they had been using internet from last 2 years and 30% reported that they are using internet for more than 5 years. Another study done by Nath et al (2016) found that 36.7% subjects had used internet for 5–8 years, while 42.0% had used the Internet for 3–6 years.

In the current study the majority of the participants i.e 53% log in to social networking sites for 2-5 times per day, 30.8% participants log in for >5 times a day and 16.2% log in for <2

times a day. The reason of log in to social networking sites may be due to free and unlimited access to the Internet, ease of access to internet via mobile, ease excess to information and sometimes as an easy route of escape from exam stress.

The length of internet use per day is 2-5 hours for most of the participants i.e 42.7%, <2 hours for 32.5% of the participants and >5 hours for 24.8% participants. The present study findings are consistent with the study done by Limaye et al (2015) where they have found that 80% respondents spent 3-5 hours daily, followed by 10% who spent 1 hour daily, 9.33% spends 2 hours daily and finally 1 student spent 7-10 hour daily surfing on internet. Similarly, a study done by Ali et al (2019) found that 18% of the participants spent one to two hours, while 40% spent two to three hours and 31.33% spent more than three hours on internet per day.

The present study showed that 50.4% spends less than 200 rupees per month on internet, 45.3% spends 200-400 rupees and 4.3% spends >400 rupees, whereas a study done by Kumar et al (2017) found that the expenditure on the monthly internet pack exceeded more than Rs. 400 among 64% of the respondents. On the other hand, a study done by Nath et al (2016) found that 41.5% students spent 200–400 rupees/month on the Internet, followed by 30.3% who spends less than 200 rupees/month.

It is obvious that participants will use internet through some of the methods and multiple responses are obtained from the participants. In the present study out of the total participants it was found that 15.4% uses desktop, 99.1% uses smartphones, 28.2% uses laptop, 2.6% uses tablet and 2.6% uses smartwatches. This finding is contradictory with the study findings done by Deniz et al (2015) where they found that 59% of the participants uses internet in their own PC, laptop or tablet. This is followed by 26% of the participants who prefer own smart phones or androids. Later 7.02% uses internet cafe, finally 2.80% participants prefer friends' computer for accessing internet. In the present study maximum participants uses smartphones, the reason might be easy availability of smartphones.

In the current study participants responded multiple social networking sites like Facebook by 59.0%, WhatsApp by 88.0%, YouTube by 82.1%, Instagram by 50.4% and others like twitter by 1.7%. The present study is contradictory with the study done by Kumar et al (2019) where they found the most commonly accessed social networking sites were Facebook by 72.7% and WhatsApp by 64%. On the other hand a study done by Deniz et al (2015) found that the mostly used social media is Facebook with 56.4%, secondly twitter comes by 20.71% and later Instagram comes with 14.29%, and then LinkedIn with 5.71% and others approximately by 2.9%.

Internet is used for different purposes and similarly in the current study participants had given multiple responses for purposes of internet use like internet gaming by 66.7%, for education by 94.9%, for entertainment by 92.3% and for chatting by 89.7%. Majority of the participants said education as a purpose of internet use. It may be due to availability of information on any topic at the click of a button, online teaching videos which help students in acquiring knowledge. The present study findings are consistent with the study done by Limaye et al (2015), where they have found that 60% used internet for academic work, followed by 20% used it for chatting and making friends, 17% used it for playing games and 13% students used it for more than one reason. None of the students used internet for commercial purpose. Similarly, study done by Saikia et al (2019) is contradictory to the

present study, where they found that the main purpose of using the Internet was social networking by 71.4% followed by study by 42.1% participants.

Section II: Discussion of level of internet use, sleep quality, level of depression and anxiety of the participants.

All the participants use internet, out of which 50.4% was under normal internet use, 39.3% had mild internet addiction, 10.3% had moderate internet addiction and none of the participants come under severe internet use. The present study findings were consistent with the study done by Saikia et al. (2019) found that 65.4% of the respondents had mild internet addiction, 13.46% had moderate, and 1.9% had severe addiction. On the other hand, a study done by Kumar et al (2019) found that 1.41% respondents were excessive internet users, while 30.28% and 23.94% were classified as moderate and mild internet users, respectively. The global PSQI score showed that 49.6% had good sleep quality and 50.4% had poor sleep quality. The present study finding is consistent with the study done by Khayat et al (2018) where they found that 54.4% have poor sleep quality, on the other hand 45% of the students had good sleep quality. Another study done by Yang et al (2018) found that 39.1% of adolescents met the criteria for sleep disturbance.

In the present study while assessing depression it was found that 44.4% were in normal range, 15.4% had mild depression, 23.1% had moderate depression, 10.3% had severe depression and 6.8% had extremely severe depression, whereas while assessing anxiety it was found that 34.2% were in normal range, 7.7% had mild anxiety, 31.6% had moderate anxiety, 12% had severe anxiety and 14.5% had extremely severe anxiety. Similarly, a study done by Ali et al (2019) found that 11.3 % of higher secondary school students were having mild depression and 4.6 % were having moderate depression and 6.6 % were having mild anxiety and 4.6 % were having moderate anxiety**.**

Section III: Discussion of the association of socio demographic variables and pattern of internet usage with level of internet use, sleep quality, level of depression and anxiety of the participants.

In the present study it was found that, there was no significant association between internet use and gender, semester, stream, religion, household income, amount of pocket money received and living status and also there was no significant association between internet use and patterns of internet usage. Present study result is contradictory to the study done by Kumar et al (2017) which showed statistically significant association between Internet addiction and gender, duration of internet usage and expenditure on the monthly internet pack among the internet addicts, but no association was found between internet addiction and other demographic factors like education and occupation of parents and internet usage related characteristics like years of computer usage and years of internet usage. Whereas, another study done by Ching et al (2017) found a significant association between duration of internet use and internet addiction.

Results also shows significant association between sleep quality and semester and length of internet use per day, between level of depression and age, semester of the participants and consultation of excessive internet use and between level of anxiety and years of internet use.

Section IV: Discussion of the correlation between internet use and sleep quality, depression and anxiety of the participants.

The current study found that that there was a significant positive correlation among internet use and depression (r=0.241, p=< 0.05) and anxiety (r= 0.257, p=< 0.05). Similarly, a study

done by Ali et al (2019) founds that Online cognition score (problematic internet use) was positively correlated with depression (r=123, p≤ 0.01) and anxiety (r =0.179, p≤ 0.01). The present study findings are also supported by a study done by Gunay et al (2018) which showed that there was a positive correlation between Internet Addiction Scale score and Becks Depression Inventory score (r=0.325, p<0.001). Another study done by Bhat SA et al (2015) also revealed that there was a significant positive correlation (r=0.809, p = <0.001)) between internet addiction and depression among university students. The findings of another study done by Ahmet et al (2011) is also consistent to the present study findings which revealed that that there were significant correlations between internet addiction and depression, anxiety.

The current study found that there is no significant correlation between internet use and sleep quality. On the other hand, a study done by Khayat MA et al (2018) established a significant statistical correlation between sleep quality and level of Internet addiction.

The study shows that as the internet use increases the depression and anxiety will also increase. It is an appeal to the schools and college authorities, Government and policy makers to look on to this matter and create awareness regarding internet use and its consequences among the students, parents and community as a whole. Further research can be conducted in this context to examine the factors broadly which can help in better management of the client. The present research findings will offer guidance to the students to focus and understand priorities while studying. It will help the students to learn how to balance between social and academic use. This can be managed by institutes through counselling, seminars and workshops. The students should also focus on the importance of Internet use, its pros and cons.

There are certain limitations in the study like the tool DASS 21 was used to measure depression and anxiety. It measures depression in terms of dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia and inertia. But it has no clinical significance to severe or extremely severe depression as per ICD/DSM and also the study findings cannot be generalized as the sample size is small.

REFERENCES

Ahaskar A. (2019). India has second-largest population of monthly active internet users: report. LiveMint

Ahmet A, Murat İ. (2011) Internet Addiction and Depression, Anxiety and Stress. *International Online Journal of Educational Sciences*, 3(1), 138-48.

Ali A, Horo A, Swain MR, Gujar NM, Deuri SP. (2019). The Prevalence of Internet Addiction and its relationship with Depression, Anxiety and Stress among Higher Secondary School Students: North-East Perspective. *Journal of Indian Association Child Adolescence Mental Health*, 15(1), 13-26. Available from: http://www.jiacam.org/1501/orig1Jan2019.pdf

Bhat SA, Kawa MH. (2015) A Study of Internet Addiction and Depression among University Students. *International Journal of Behavioral Research & Psychology*, 3(4), 105-108. Available from: https://scidoc.org/IJBRP-2332-3000-03-403.php

Ching SM, Awang H, Ramachandran V, Lim SM, Sulaiman WA, Foo YL et al. (2017). Prevalence and factors associated with internet addiction among medical students - A cross-sectional study in Malaysia. *Med Journal Malaysia*, 72(1), 7-11. Available from: http://www.e-mjm.org/2017/v72n1/internet-addiction.pdf

Deniz MH, Geyik SK. (2015) An Empirical Research on General Internet Usage Patterns of Undergraduate Students. *Procedia - Social and Behavioral Sciences*, 895-904. doi: 10.1016/j.sbspro.2015.06.369

Erceg T, Flander G B, Brezinšćak T. (2018). The Relationship Between Compulsive Internet Use and Symptoms of Depression and Anxiety in Adolescence. *Alcoholism and Psychiatry Research,* 54, 101-12 DOI: 10.20471/dec.2018.54.02.02

Gunay O, Ozturk A, Ergun-Arslantas E, Sevinc N. (2018). Internet Addiction and Depression Levels in Erciyes University Students, Dusunen Adam. *The Journal of Psychiatry and Neurological Sciences*, 31(1), 79-88. DOI: 10.5350/DAJPN2018310108

Karthika S, Kaur A, Saini A, Kaur B, Bharti, Damini et al. (2017) A descriptive study to assess the knowledge and attitude regarding internet usage and its addiction level among students studying in selected colleges of Ambala, Haryana. *World Journal of Pharmacy and Pharmaceutical Sciences*, 6(9), 477-508.

Khayat M A, Qari H M, Almutairi B S, Shuaib B H, Rambo M Z, Alrogi M J et al. (2018). Sleep Quality and Internet Addiction Level among University Students. *The Egyptian Journal of Hospital Medicine,* 73(7), 7042-47. Available from: https://ejhm.journals.ekb.eg/article_17224_789b214ff0d9895d7f31d0b93c07ecd.pdf

Kumar A, Nawaz AS, Kumar R, Yamuna BN. (2017). Internet addiction and factors associated with it: a cross sectional study among students of a medical college in Davangere, Karnataka. *International Journal of Community Medicine and Public Health*, 4(7), 2525-30. DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20172853

Kumar N, Kumar A, Mahto SK, Kandpal M, Deshpande SN and Tanwar P. (2019). Prevalence of excessive internet use and its correlation with associated psychopathology in 11th and 12th grade students. *General Psychiatry,* 32. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6551435/

Limaye R, Fotwengel G. (2015). Use of Internet Among Undergraduate Students From Mumbai. India. *International Journal of electronics & communication technology*, 6(2). Available from: http://www.iject.org/vol62/1/5-Rewati-Limaye.pdf

Nath K, Naskar S, Victor R. (2016). A cross sectional study on the prevalence, risk factors and ill effects of internet addiction among medical students in Northeastern India. *Prime Care Companion CNS Discord*,18(2). doi: 10.4088/PCC.15m01909

Poli R. (2017). Internet addiction update: diagnostic criteria, assessment and prevalence, Neuropsychiatry, 7(1), 04-08.

Puspita RH and Rohedi D. (2018). The Impact of Internet Use for Students, *ICIEVE 2017 IOP Publishing IOP Conf. Series: Materials Science and Engineering* doi:10.1088/1757-899X/306/1/012106

Rosenberg KP, Feder LC. (2014). Behavioural Addictions Criteria, evidence and treatment. *USA: Academic press Elsevier*, 99-106

Saikia AM, Das J, Barman P, Bharali MD. (2019). Internet addiction and its relationships with depression, anxiety and stress in urban adolescents of kamrup district. *Assam journal of family and community medicine*, 26(2), 108-12.

Tan Y, Chen Y, Lu Y, Li L. (2016). Exploring Associations between Problematic Internet Use, Depressive Symptoms and Sleep Disturbance among Southern Chinese Adolescents. *International Journal of Environmental Research and Public Health*, 13(3), 313. doi:10.3390/ijerph13030313

Yang J, Guo Y, Du X, Jiang Y, Wang W, Xiao D et al. (2018). Association between Problematic Internet Use and Sleep Disturbance among Adolescents: The Role of the Child's Sex. *International Journal of Environmental Research and Public Health*, 15(2682). doi:10.3390/ijerph15122682