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The Statistical Analysis of Social Networks and the Effect on Sleeping Quality of Undergraduate Students

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Abstract
The aim of this article is to study and examine how the different social networks were affecting the sleeping quality of undergraduate students. A case study was performed in Maharani Cluster University. The simple random sampling technique is used to select the samples and data is collected from selected samples through self-administered questionnaire. The suitable statistical tool called Pearson Chi-square test procedure is used to analyze the data and draw the inference based on p-value by using R-software.

Keywords
Simple Random Sampling, Chi-Square, Questionnaire, Social networks, R-software.

1. Introduction

The world is driven by technology, where learning for the students has become quite easy. Social network is a tool that is becoming quite popular these days because of its user-friendly features. The network platforms like Face book, Instagram, What's App, You Tube, Snap chat are giving people a chance to connect with each other across distances. On a professional level the usage of social media helps to expand and broaden the level of knowledge in a particular field and build on a professional network by connecting with the other professionals in the world (W.Akram, R.Kumar, 2017). A Finnish study has found that there has been a gradual reduction in sleep and increase in the sleep complaints over the last 30 years (Erkki Kronhalm et al., 2008) and poor sleep quality is a common issue in the modern world. Studies validate the prevailing idea that teenagers are consistently engaged with their smartphones. Around 95% of adolescents have access to smartphones and, not surprisingly, around 45% report being online and using the sites (Anderson, M. & Jiang, J., 2018). But recent research points give the importance of social media effects on sleep quality (Li, X., Buxton, O. M., Lee, S., Chang, A. M., Berger, L. M., & Hale, L., 2019). Where university students are especially impacted by the sleep epidemic (Jensen, 2003). In one study, more than 76% of university students reported occasional sleep problems (Vail-Smith, Felts, & Craig.C) where sleeping disorders are a common health problem among young adults. It has been reported that the amount and the quality of the sleep of university students has changed in the past few decades and studies have proven that the more time spent on social media or social networking sites contribute to poor sleeping quality (Navya.M.Patel., August 2021). In this article the study is on the influence of social networking sites and its effect on sleeping quality of undergraduate students in Maharani Cluster University, Bengaluru.

2. Methodology

A case study was conducted to solicit the data and information from a sample of students of Maharani Cluster University during the lecture hours of the week in order to measure the factors the set of questionnaire was designed by the researchers to collect the information and the data through a self - administered questionnaire which contained the main questions required for the survey such as 'do social networks affect the sleeping quality of the undergraduate students', 'what kind of social network affects the sleeping quality' etc. The samples for this study were collected through simple random sampling technique where 394 questionnaires were distributed among the students and only 303 responded, where the data were collected and segregated on Microsoft office by using the appropriate statistical tool called descriptive statistics such as frequency, percentages and pie charts and bar graphs were used. The data were analyzed by using the Chi-square test for comparing the effect of using social networks on sleeping quality, and draw the inference based on obtained p-value through R-software.

3. Hypothesis

Null Hypothesis (H_0)

There is no significant association effect between sleeping quality and usage of social networks.

Alternative Hypothesis (H_1)

There is a significant association effect between sleeping quality and usage of social networks.

Table 1: Sample Data

Course	Total Sample	Percentage (%)
B.Sc.	226	74.58
B.Com	56	18.48
B.A	21	6.93
Total	303	100

During the survey the participants were asked whether they use mobile phones or not , further the follow up question was to identify whether they have the knowledge to use the social networking sites or not , where the above responses shows that all of them had an knowledge to use the social networking sites , the above revelation confirmed that most of them knew how to use the technology based on (kist, 2008) where the study revealed that 90% of the teens in the United States of America had the access to the internet facility which helps to make plans and socialize among the friends .

Table 2: Time spent on social networking sites per day

Time Spent	Frequency	Percentages (%)
30min-1hr	217	71.61
2-3hr	62	20.46
4-5hr	24	7.9
Total	**303**	**100**

During the survey the respondents were asked to share their amount of time spent on the social networks, where 217 number of respondents indicated that 71.61% spent thirty minutes to one hour in a day while, 62 of the respondents indicated that 20.46% have spent two to three hours of time on the social networks, whereas only 24 respondents indicated 7.9% of the of time to be spent on social media. The average of 279 respondents indicating 92.07% of the majority of the time spent on social media sites. The responses assert that more time is spent on social networking sites due to their popularity.

Table 3: Social Media Affects the Sleeping Quality of the Students

Responses	Frequency	Percentage (%)
Yes	253	83.49
No	34	11.22
Not Much	16	5.28
Total	**303**	**100**

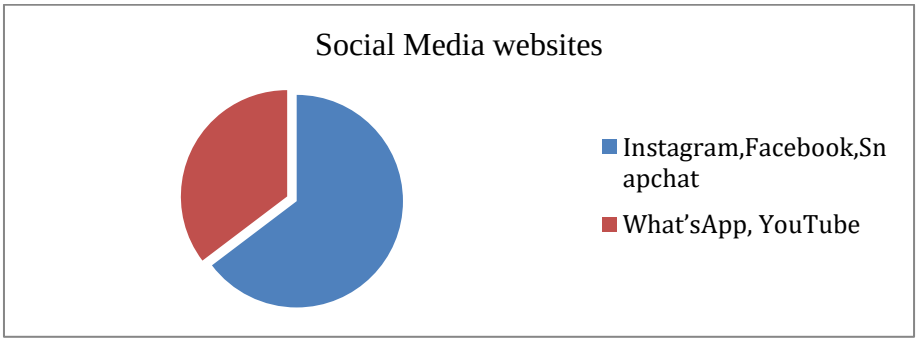
During the survey the participants were asked whether the usage of social media affects the sleeping quality, among which 253 respondents indicated that 83.4% answered in a positive manner whereas 11.22% of the responses were negative, whereas 16 of the respondents representing 5.28% were not sure whether the usage of the social networks is affecting the sleeping quality. This was further supported by (W.Akram, 2017) where the study proves that social networking sites were really affecting sleep quality.

Table 5: Distribution Of Participants According to Usage of Social Media Networking: (n=303)

Social Media Websites	Frequency	Percentages
Instagram,Facebook,Snapchat	196	64%
What'sApp, YouTube	107	35.31%
Total	**303**	**100.0**

Table -1 reveals that the social networking websites were divided into two groups - Instagram, Facebook and Snapchat and the other group was What's app and YouTube - based on the participants' self-reported responses to the questionnaire**.**

Figure 2: Graphical Representation of Distribution of Social Networks:



The above graph shows that there were 35.31% of users of What's app and YouTube and 64% of users were Instagram, Facebook and snapchat and based on the above table which shows that the maximum number of students used Instagram, Facebook and snapchat more than any other networks.

Table-4: Distribution Of the Participants According to The Sleeping Quality: (N=303)

Sleeping Quality Index(hours)	**Frequency**	**Percentage**
Good Quality (≥5)	109	35.97%
Poor Quality (<5)	194	64.68%
Total	**303**	**100.0**

Table-4 shows that the number of hours of sleep was assessed by the method of a self -reported questionnaire which contained the number of hours of sleep in a day. The short sleep duration was preferred as less than 5 hours according to the general sleep duration. The above table shows the sleeping quality index scores obtained during the study and the amount of sleeping hours they have received. The total PSQI average of the students is calculated as the ratio of the students with sleep quality average higher than 5 is 35.97%.

Figure 1: Graphical Representation of Distribution of Sleeping Quality Index:

It can be deduced from the graph that majority of the respondents 35.97% affirmed to have good quality of sleep and 64.68% of the respondents reported to have poor sleeping quality, whereas only 35.97% of the respondents sleep more than 5 hours a day this may be due to the less number of hours they have spent on usage of social networking sites.

Table 6 : 2×2 Contingency Table on Sleeping Quality and Social Media Networking User

	Social Networking Websites		
Sleeping Quality	**Instagram,Facebook,Snapchat**	**What'sApp,YouTube**	**Total**
Good (≥5)	42	67	**109**
Poor(<5)	154	40	**194**

Total	**196**	**107**	**303**

The above contingency table displays the frequencies for the combinations of two categorical variables such as sleeping quality and social networks. The above table shows that the social networking websites are affecting the sleeping quality of the participants, where Instagram, Facebook, snapchat users are more likely to experience the poor sleeping quality, where What's app and YouTube users are also affected in the sleeping quality but not as much as compared with the other social networking user. The following result is computed using a chi-square test for testing the independence of association between sleeping quality and usage of social networking. The chi square test statistic = $\chi^2 = \sum \frac{(O-E)^2}{E} \sim \chi_{(r-1)(c-1)}$ where: O=observed frequency, E= expected frequency

a) Pearson's Chi-Square value: 50.9801
b) P-value: 0.00001.

4. Inference

Since the p-value is less than 0.05, H_0 is rejected, that is there is a significant association effect between the sleeping quality and usage of social networks.

5. Conclusion

The main objective of this study was to test the relationship between social networking sites effect on the sleep quality of the students, based on this study which concludes that more than half of the undergraduates who use social networking service websites such as Instagram, Facebook and snapchat were among (64.68%) and what's app and YouTube were among (35.31%). In addition to the study which revealed that there were a greater number of Instagram, Facebook and snapchat users as compared to What's app and YouTube users. The statistical result shows that there is a significant association effect between sleeping quality and social media usage within the study. The study further revealed that more usage of social networking services will affect the sleeping quality of the students.

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