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Data Analysis of Social Media's Impact on COVID19 Pandemic Users' Mental Health

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ABSTRACT

Social media has a significant impact on people's daily lives and spread widely. Unrestrained usage of social media could have worsening consequences on mental health. The majority of COVID-19 users who were exposed to social media learned numerous facts, which made their anxiety and depression-related mental health disorders worse. This study aims to determine how social media usage affects users' mental health during the COVID19 pandemic. Through surveys and expert interviews, this study collects both quantitative and qualitative data. The total number of respondents involved was 106 with the average age group of 18-41-year-old. Using reliability testing (Cronbach alpha test) and inferential statistic (Pearson Correlation and Chi-Square), results show that during the COVID-19 pandemic, there is a significant link between social media use and mental health. Anxiety and depression brought on by social media are more common among young adults, predominantly female, between the ages of 18 and 24 than in men. Additionally, correlation plot analysis with a variety of queries reveals the mental health issues and activities on social media.

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1. INTRODUCTION

Recently, especially during the COVID-19 pandemic, mental health issues have gained a lot of attention. The epidemic has caused a substantial amount of dread, worry, and concern among a vast population worldwide [1][2]. A vast population worldwide is required to remain at home and work from there as a precaution against the COVID-19 epidemic [3][4]. Online and digital activities have dramatically increased because of prolonged home isolation. One of the activities would be using social media, with the average daily use of 2 hours and 24 minutes worldwide and a percentage of large populations rising to 43% [5][6].

During the epidemic, prolonged use of social media could harm people's mental health and well-being. Although it could affect anyone at any age, young adults between the ages of 18 and 25 would have a higher tendency to be affected because they are more likely to be experiencing a mental crisis than other age groups [7][8]. These are challenging times as the pandemic may exacerbate their mental health [9][10].

Figure 1 below depicts the potential connections between adult users of social media and depression symptoms. These users' usage of social media unintentionally contributed to their depression symptoms, which were brought on by poor sleep, online bullying, and poor body image, all of which contributed to low self-esteem. Social comparison can also lead to low self-esteem.

Realizing that technology might pose such a risk to mental health, and in the worst instance, suicide ideation is alarming. One of the social media platforms that have been associated with mental health is Instagram [11]. Instagram use has been linked to eating disorder symptoms, depressive symptoms, low self-

esteem, negative body image, and body dissatisfaction, according to research [12]. Hence, conducting research on the effect of social media on mental health during the Covid19 pandemic is possible and necessary [13].

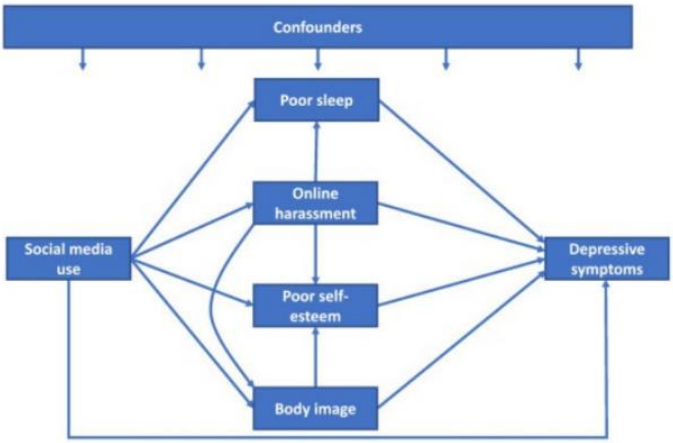

Figure 1. Social media use and depressive symptoms in young adults [14]

Generally, many social media platforms are being used during the pandemic, and these platforms are being used for a variety of activities that may result in early-stage mental health issues like fear, concern, or low self-esteem. If these issues are not treated, users may experience anxiety, depression, and other mental health issues.

2. MATERIAL & METHOD

The stages of the research process carried out in this study are described in a research methodology flow as shown in figure 2 below.

2.1. Data Collection

In this study, both quantitative and qualitative data were collected. In total, 106 people responded to the survey, which had 24 questions, plus an expert interview with a practicing psychologist who had experience providing counseling during the pandemic. The requirement that a psychologist is registered on an official consultation website in Indonesia, such as Okadoc, Alodokter, etc., is one of the criteria for choosing a psychologist.

The survey's questionnaire is divided into four pieces: the demographic profile, social media use during the pandemic, sections on the disease's negative effects, and portions on its positive effects. The purpose of demographic profiles is to collect data on demographics like gender, age group, nationality, education level, and employment status. Five questions make up this section.

Social media exposure during the pandemic is used to learn about the opinions, experiences, or viewpoints of the participants on the relevant subject. To gauge how much they agree, how frequently they utilize the site, and how likely they are to encounter it, this portion uses linear five-scale questions. Open-ended questions with both short and extensive answer texts are included in this area. There are twelve questions in this section of the survey.

If participants chose "Negative" in the previous conditional question, the Negative Impact Section is displayed. In this portion, the participants are questioned about how the pandemic's negative effects on social media have affected their mental health. Three questions make up this section.

If participants chose "Positive" in the previous conditional question, the Positive Impact Section is displayed. In this section, individuals are questioned about how social media during the epidemic has had no negative or neutral effects on their mental health. Four questions make up this section.

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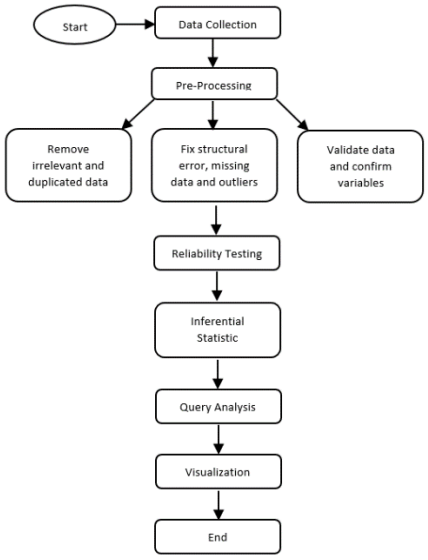

Figure 2. Research Methodology

2.1. Pre-Processing

Several procedures have been carried out at this level, including the removal of redundant and irrelevant data. Fixing structural errors, outliers, and any missing data comes next. Finally, confirm the variables that were used and validate all the information that was gathered from the expert interview and survey.

2.2. Reliability Testing

The internal consistency, or how closely connected a set of things are to one another as a group, is measured at this stage using Cronbach's alpha [15]. Cronbach's alpha must be at least 0.70; below this level, the common range has poor internal consistency. The highest predicted value is 0.90, and anything above this point is seen as redundant or redundant.

2.3. Inferential Statistic

Determining whether a variable has a strong association with another variable (s). The Pearson Chi-Square Test and Pearson Correlation Coefficient were the inferential statistics techniques that were applied. To show if two variables are correlated or related to one another, Pearson's r is typically utilized. The variables must be continuous rather than categorical in order to meet the requirements for running the test. Pearson's r is a correlation coefficient that varies from -1 to +1, where 0 indicates no link at all and -1 or 1 indicates a high relationship. Pearson Chi-Square is normally used to demonstrate whether there is a relationship between the two categorical variables.

2.4. Query Analysis

By merging various data to identify patterns, this stage focuses on identifying relationships between social media usage and mental health issues during the COVID-19 pandemic.
Some queries used in this study are

- Analysis to Find Top Mental Health Issues,
- Analysis to Find Top Activities on Social Media,
- Analysis of Anxiety Caused by Checking COVID-19 News on Social Media,
- Analysis of Depression Caused by Checking COVID-19 Cases on Social Media,
- etc.

2.5. Visualization

Data and information are graphically represented through visualization. In order to make the studied data and information easier to grasp and draw conclusions from, this stage involves putting the data or information into a visual context, like a map or graph.

3. RESULTS AND DISCUSSION

In accordance with the research methodology, the results of each phase are discussed in this section.

3.1. Data Collection Results

The results of the survey that was conducted among the respondents are shown in the following figures 3, 4, 5 and 6.

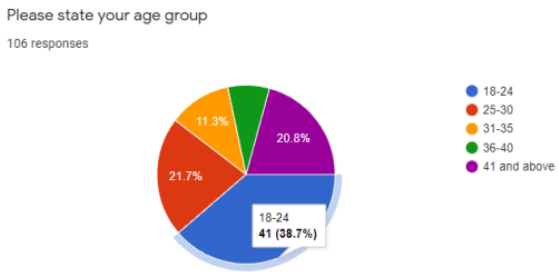

Figure 3. Demography profiles of the respondents (age)

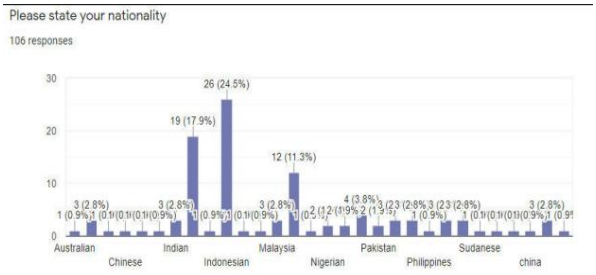

Figure 4. Demography profiles of the respondents (nationality)

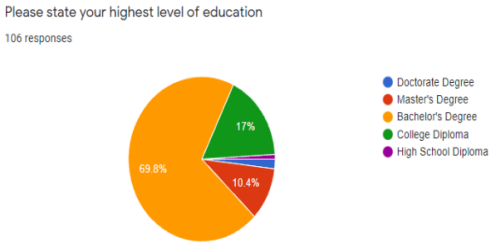

Figure 5. Education profiles of the respondents

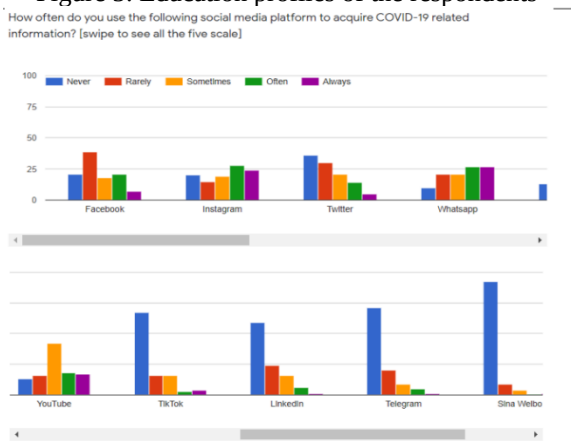

Figure 6. Type of Social Media that is frequently used by the respondents

In addition to surveys, this study's data collection process included expert interviews. The interview was conducted through an internet application due to the pandemic condition, where social distance was the primary issue in 2021. Figure 7 shows an expert interview conducted using the Zoom application.

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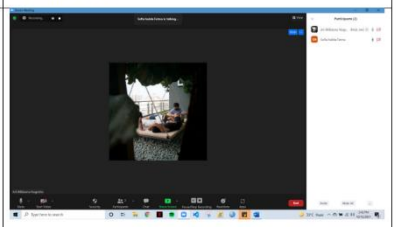
Media Used for Interview	Zoom
Date	Tuesday, 12th October 2021
Time	14:00-14:50 MYT
Meeting	

Figure 7. Screen shot of interview session with expert

There were significant questions asked to the experts some of them are:
Q1: In your perspective, is there a correlation between social media and mental health during the pandemic?
Q2: If there is a correlation, does it mean that excessive exposure to social media during the pandemic may lead serious impact on mental health?
Q3: What are the impacts of social media on mental health?
Q4: What kind of activities on social media may increase the tendency to get a negative impact on mental health?
Etc.

3.2. Pre-Processing Results

In this stage, the results of quantitative data are pre-processed to be properly analyzed in the next stage. Firstly, data are arranged in the form of a CSV file like it is shown in figure 8.

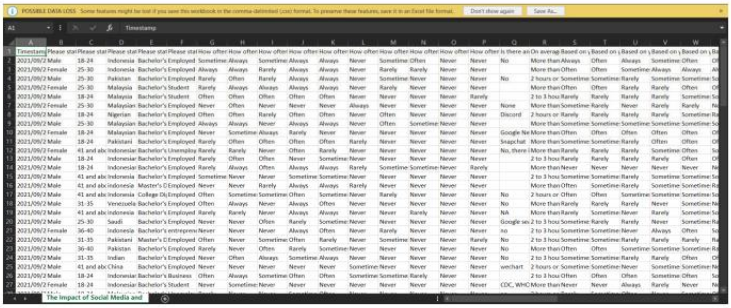


Figure 8. Survey of respondents in CSV file

After that, data cleaning procedures including removing redundant and irrelevant data are carried out.

3.3. Reliability Testing Results

Cronbach's Alpha Test is most commonly used when there are multiple Likert scale questions in a questionnaire and this test is used to test whether or not the scale is reliable. Technically, this test generates results in several 0 to 1 only.
Cronbach Alpha formula:

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N-1)\,\bar{c}} \quad (1)$$

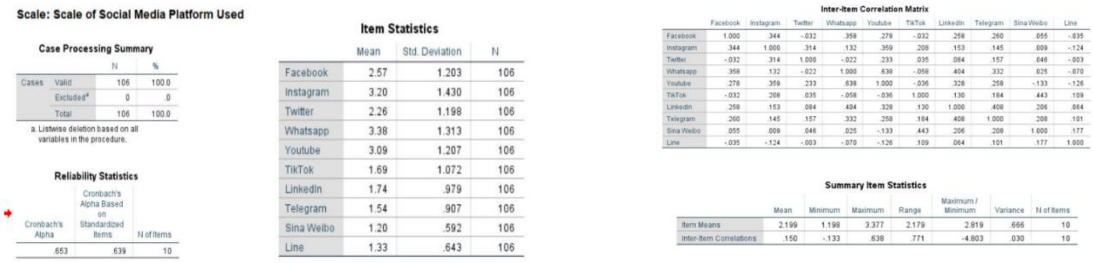
This formula is applicable for inter-item covariance. Here, N is for the total number of items, $\bar{c}$ is for the average inter-item covariance among the items, and $\bar{v}$ is for the average variance. In this study, Cronbach's alpha testing is applied to the variables that have been identified earlier. Some of the testing results are presented in Figures 9 to Figure 11.

In figure 9, Cronbach's Alpha score for this scale is 0.653, which is minimally acceptable. it is found that there are strong correlation among the items such as anger and anxiety (0.778), anxiety and depression (0.739), fear and depression (0.760), anxiety and self-esteem issue (0.728), self-esteem issue and depression

(0.751). To conclude, the overall mean of inter-item correlation for this scale is 0.487, which is ideal. There is a correlation among the items and thereby can be used for further analysis and recommendations.

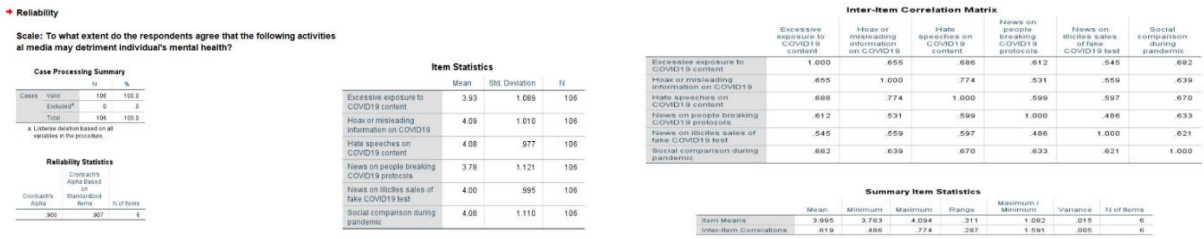
In figure 10, the Cronbach's Alpha for this scale is 0.906, which is considered excellent. However, it is found that some of these items do correlate with each other such as hate speeches on COVID-19 content and hoax or misleading information on COVID-19 (0.774), excessive exposure to COVID-19 content and hate speeches on COVID-19 content (0.686). COVID-19 content/news tends to have the most hate speeches from users. The users are mostly in denial and disbelief.

In figure 11, the Cronbach's Alpha for this scale is 0.896, which is considered good. It is found that there are strong correlations among the items such as anger and anxiety (0.778), anxiety and depression (0.739), fear and depression (0.760), anxiety and self-esteem issue (0.728), self-esteem issue, and depression (0.751). To conclude, the overall mean of inter-item correlation for this scale is 0.487, which is ideal. There is a correlation among the items and thereby can be used for further analysis and recommendations.



(a) (b)

Figure 9. Cronbach's alpha for Social Media Platform Used by the Respondents (a) Scale (b) Inter-Item Matrix



(a) (b)

Figure 10. Cronbach's alpha for Social Media Activities that may detriment mental health (a) Scale (b) Inter-Item Matrix

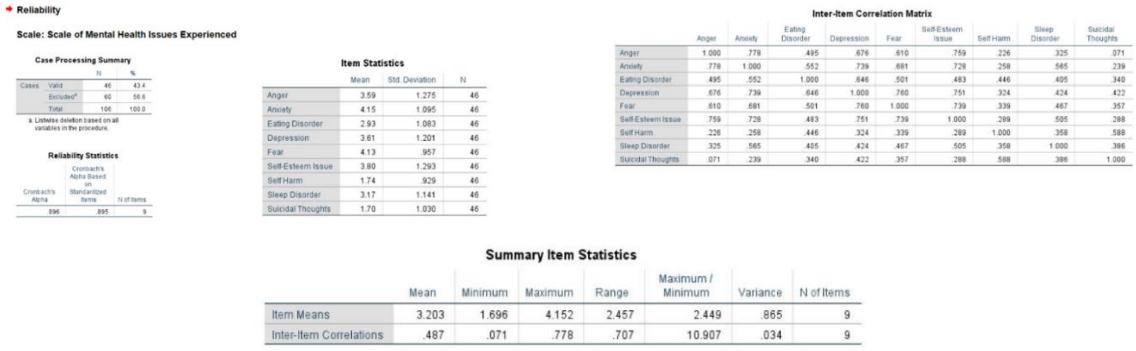


Figure 11. Cronbach's alpha for Experienced Mental Health Issues (a) Scale (b) Inter-Item Matrix

3.4. Inferential Statistic Results

Pearson Correlation is used to demonstrate whether the two variables are correlated or related to each other. In this study, Pearson's correlation is observed between activities on social media during the COVID-19 pandemic and mental health issues as captured in figure 12.

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Figure 12. Pearson's r Correlation of nine variables

The results show that the most significant correlation is between checking COVID-19 cases and anxiety (0.698), social comparison and depression (0.657), checking COVID-19 cases and depression (0.620), and social comparison and self-esteem issues (0.539). The Pearson's r-value for these correlations is high (0.60-0.79, refer) and although the Pearson's r-value for social comparison and self-esteem is moderate (0.40-0.59), there is a chance of occurrence of mental health comorbidities here. The summary of Pearson's correlation can be found in figure 13 below.

Activity	Mental Health Issue	Pearson's r value	Value	Comorbidity	New Value
Checking COVID-19 cases	Anxiety	0.698	High Correlation	Fear (Anxiety – Fear=0.681) Depression (Fear – Depression=0.760)	High Correlation
Checking COVID-19 news	Anxiety	0.575	Moderate Correlation	Fear (Anxiety – Fear = 0.681) Depression (Fear – Depression=0.760)	High Correlation
Social Comparison	Self-Esteem Issue	0.539	Moderate Correlation	Anxiety (Self-Esteem Issue – Anxiety=0.728) Depression (Anxiety – Depression=0.739)	High Correlation
Read Users' Comments	Fear	0.429	Moderate Correlation	Anger (Fear – Anger=0.610) Depression (Anger – Depression=0.676)	High Correlation

Figure 13. Correlation of Activities and Mental Health Issues and its Comorbidity

3.5. Query Analysis Results

Several queries were created for the query analysis, and some of the findings are shown with graphical perspectives in figures 14 and 15. This investigation concentrated on respondents who reported using social media for more than three hours per day, and it was discovered that the majority of respondents had anxiety, low self-esteem, fear, and other serious problems that could lead to depression. What triggers the respondents to experience the above mental health issues is due to Excessive exposure to COVID-19 content, such as checking COVID-19 news and COVID19 cases.

Due to travel limitations, a large population is forced to stay at home for an extended period. As a result, they spend more time than normal on social media or websites for several purposes, including being exposed to COVID-19-related news or information. Overexposed to these can be very upsetting for the users and may result in increased anxiety and stress, and this excessive stress may lead to depression.

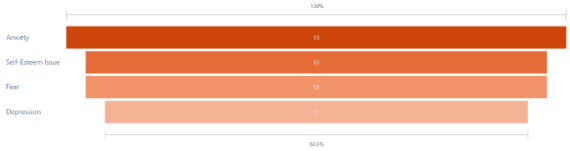

Figure 14. Analysis to Find Top Mental Health Issues

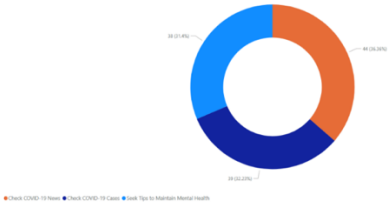

Figure 15. Analysis to Find Top Activities on Social Media

3.6. Visualization Results

Because it provides a thorough overview of the data as a whole, data visualization is used in this study. Additionally, an interactive dashboard that offers a summary of the same information has been constructed. The dashboard is displayed as a thorough snapshot for micro-level visualization of the required collection of data in the following figures 16 and 17.

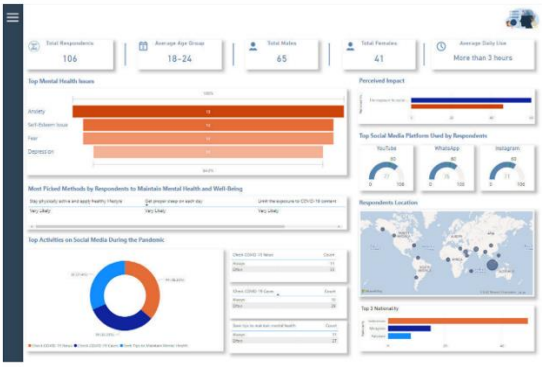

Figure 16. Dashboard Main Page

Figure 17. The side menu of the dashboard for an interactive session with users

The following graphs (18–19) present a data analysis visualization that focuses on the relationship between social media activity and mental health issues and identifies constructive activities that may help to resolve problems by maintaining close relationships with loved ones and close friends as well as looking for inspirational quotes. The count positivity in figures 32 and 33 points to therapeutic activities that could aid people in coping with mental health problems.

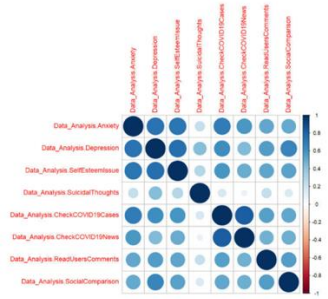

Figure 18. Correlation among Mental Health Issues and Activities on Social Media

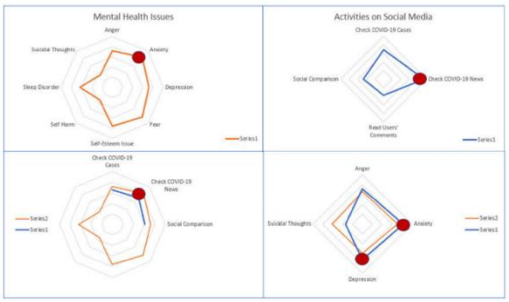

Figure 19. Mental Health Issues and Activities on Social Media

4. CONCLUSION

There is a significant correlation between mental health and social media during the COVID-19 pandemic. Anxiety and depression caused by social media are more prevalent among young adults (age 18 to 24), mainly females. In addition, young adults (age 18 to 24) have a higher tendency to get triggered than middle-aged adults, with excessive exposure to information, news, or anything related to COVID19 and also to over-comparing themselves to others. The research findings also revealed users most likely suffer anxiety,

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fear, self-esteem issue, and depression when they spend more than 3 hours on social media exposing themselves to this kind of activity that exacerbates their mental health conditions.

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5. REFERENCES

[1] Abbas, J., Wang, D., Su, Z., Ziapour, A., 2021. The Role of Social Media in the Advent of COVID-19 Pandemic: Crisis Management, Mental Health Challenges and Implications. Retrieved 10 November 2021 from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8126999/

[2] Ahmad, AR., Murad, HR., 2020. The Impact of Social Media on Panic During the COVID-19 Pandemic in Iraqi Kurdistan: Online Questionnaire Study. Retrieved 10 November 2021 from: https://www.jmir.org/2020/5/e19556/

[3] Armstrong, M., 2019. Mental Health: The Impact of Social Media on Young People. Retrieved 10 November 2021 from: https://www.statista.com/chart/19262/impact-of-social-media-on-mental-health

[4] Asadzadeh, A., Pakkhoo, S., Saeidabad, M., Khezri, H., Ferdousi, R., 2020. Information Technology in Emergency Management of COVID-19 Outbreak. Retrieved from: https://www.sciencedirect.com/science/article/pii/S2352914820306262 [Accessed 10 November 2021].

[5] Bekalu, MA., 2020. Social media use can be positive for mental health and well-being. . Retrieved 10 November 2021 from: https://www.hsph.harvard.edu/news/features/social-media-positivemental-health/

[6] Bennett, C., 2021. Protecting Your Mental Health During a Pandemic. . Retrieved 10 November 2021 from: https://www.news-medical.net/health/Protecting-your-Mental-Health-During-a-Pandemic.aspx

[7] Choi, KW., Kim, YK., Jeon, HJ., 2020. Comorbid Anxiety and Depression: Clinical and Conceptual Consideration and Transdiagnostic Treatment. . Retrieved10 November 2021 from: https://link.springer.com/chapter/10.1007/978-981-32-9705-0_14

[8] Cuncic, A., 2020. How Self-Esteem Affects Social Anxiety Disorder. Retrieved10 November 2021 from: https://www.verywellmind.com/self-esteem-and-social-anxiety-

[9] Fullerton, N., 2021. Instagram vs. Reality: The Pandemic's Impact on Social Media and Mental Health. [ONLINE]. Retrieved 10 November 2021 from: https://www.pennmedicine.org/news/news-blog/2021/april/instagram-vs-reality-the-pandemics-impact-on-social-media-and-mental-health

[10] Gao, J., Zheng, P., Jia, Y., Chen, H., Mao, Y., Chen, S., Wang, Y., Fu, H., Dai, J., 2020. Mental health problems and social media exposure during COVID-19 outbreak. . Retrieved 10 November 2021 from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231924

[11] Hagadone, K., 2020. 5 Ways to Manage Your Mental Health During COVID-19. . Retrieved 10 November 2021 from: https://healthblog.uofmhealth.org/wellness-prevention/5-ways-to-manage-yourmental-health-during-covid-19

[12] Jain, Y., Chetty, P., 2021. How to handle a negative Cronbach's alpha value?. . Retrieved 10 November 2021 from: https://www.projectguru.in/how-to-handle-a-negative-cronbachs-alpha-value/

[13] Kelly, Y., Zilanawala, A., Booker, C., Sacker, A., 2018. Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study. . Retrieved 10 November 2021 from: https://www.sciencedirect.com/science/article/pii/S2589537018300609

[14] Kemp, S., 2021. TikTok Hits 1 Billion Users—Faster Than Facebook (And More New Stats). . Retrieved 10 November 2021 from: https://blog.hootsuite.com/simon-kemp-social-media/

[15] Koetsier, J., 2020. Reddit, Facebook, Twitter Worst For Mental Health Post-Coronavirus; YouTube Best. . Retrieved 10 November 2021 from: https://www.forbes.com/sites/johnkoetsier/2020/04/26/reddit-worst-for-mental-health-for-covid19-news-consumption-survey-says/?sh=3d21872831cf