

Mental Health Related Problems in the Shadow of Anxiety, Stress, Depression and Smartphone Addiction: A Study on Undergraduate Students

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Abstract: The study examined mental health, anxiety, stress, depression, and Smartphone addiction among 2004 undergraduate students in West Bengal using a descriptive survey and stratified random sampling. Key objectives were to assess variable levels and compare their dynamical nature across dichotomous groups (gender, residence, and study stream). Levels of all variables were assessed. Mahalanobis Distance was calculated to compare the dynamical nature between groups, revealing a distance less than 1 for all comparisons (male/female, rural/urban, science/social science, science/language, and social science/language). Specific findings indicated that Smartphone addiction was gender and stream dependent, depression was residence dependent, and anxiety was stream dependent. However, the overall dynamical nature showed no significant difference, leading to the conclusion that the combined health condition of the undergraduate students was independent of gender, residence, and study stream.

Keywords: Mental Health, Anxiety, Stress, Depression, Mahalanobis Distance

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1. Introduction

Mental health encompasses various dimensions and indicators. Numerous factors can promote or hinder mental well-being. Currently, many undergraduate students are experiencing mental health challenges. According to WHO [1], approximately 3.8% of individuals suffer from depression, which includes 5% of adults (4% in men and 6% in women) and 5.7% of those over the age of 60. An estimated 280 million individuals globally are affected by depression [2]. Depression is seen in women at a rate roughly 50% higher than in men. On a global scale, over 10% of pregnant women and those who have recently given birth are affected by depression [3]. Annually, more than 700,000 individuals lose their lives to suicide, making it the fourth leading cause of death among those aged 15 to 29.

Panda [4] in her article entitled 'Economic Survey 20 challenges Health issues among Indians rising; Need to bring paradigm shift to address challenges' published some important results as follows:

According to the data from the National Mental Health Survey (NMHS) 2015-16, 10.6 percent of adults in India are affected by mental disorders, with a treatment gap for these disorders ranging from 70 to 92 percent depending on the type. The NMHS further reveals that the incidence

of mental health issues is higher in urban metro areas (13.5 percent) compared to rural regions (6.9 percent) and urban non-metro areas (4.3 percent). The more extensive second NMHS is currently being conducted. Dhyanani et al. [5] noted that individuals aged 25 to 44 years are the most significantly impacted by mental health disorders. The NCERT's Mental Health and Well-being of School Students Survey shows a rising trend of poor mental health among adolescents, worsened by the COVID-19 pandemic, with 11 percent of students reporting anxiety, 14 percent experiencing extreme emotions, and 43 percent facing mood swings. Half of the students indicated that their studies contribute to their anxiety, while 31 percent attributed it to examinations and their results. In the Indian scenario, a 2021 study titled 'Effects of using Mobile Phones and other devices with Internet accessibility by children', conducted by the National Commission for Protection of Child Rights, revealed that 23.8 percent of children use smartphones while in bed, and 37.2 percent report decreased concentration levels due to smartphone usage.

According to a recent report by the World Health Organization [6], 56 million, i.e., 4.5% of Indians suffer from depression and another 38 million i.e., 3.5% Indians suffer from anxiety disorders. The community psychiatry movement, which attempted to bring mental healthcare to people living in the community, started many decades ago [7]. However, its impact on the delivery of such care in

India has been marginal. The current re-strategized National Mental Health Programme too is a long way from the vision of integration of mental health services into primary care [8]. The situation is dismal as not more than 10% of those who need mental healthcare are not receiving the required help with the existing services [9].

Chandola Basu released an article on October 9, 2024, titled 'Mind matters: Tech for India's mental health'. This article includes several important insights as outlined below:

Estimates indicate that approximately 15 percent of the population in India experiences some form of mental health issue. According to reports from 2017, about one in seven Indians is affected by a mental disorder, which translates to roughly 197.3 million individuals. The Mental State of India 2024 report further reveals that mental well-being in the nation has deteriorated in 2023 compared to 2020, with a notable decline particularly among young people aged 18 to 24. Although it is challenging to measure the extent of India's mental health crisis due to the lack of recent data, it is evident that the prevalence of mental health issues is increasing in the country.

While the Government of India (GOI) has launched various initiatives focused on mental health, including the National Mental Health Policy in 2014, the National Mental Health Policy in 2017, and the Mental Healthcare Act in 2017, a significant treatment gap still persists. The National Mental Health Survey 2016 estimated that the treatment gap for common mental disorders stands at 85.0 percent and for severe mental disorders at 73.6 percent. This substantial treatment gap arises from a shortage of services, uneven distribution of mental health resources, and high costs associated with care. Individuals often encounter numerous obstacles in accessing mental health services due to demographic factors, geographic disparities, and the stigma linked to mental health conditions. The National Mental Health Survey 2016 also projected the treatment gap for common mental disorders as 85.0 percent and for severe mental disorders at 73.6 percent.

2. Review of Related Literature

Lorga et al. [10] investigated "Depression, Anxiety, and Stress among Medical Students", with the objective of gathering data on the occurrence of these psychological conditions in medical students. The study, which involved 190 participants, underscored the considerable rates of stress, anxiety, and depression experienced by medical students during their educational journey. Shearin et al. [11] examined the "Effectiveness of an Educational Series in Reducing Anxiety among Health Professions Graduate Students", focusing on assessing the success of a combined intervention that included cognitive-behavioural therapy (CBT), mindfulness practices, and lifestyle stress management strategies in alleviating stress, anxiety, and depression among graduate students. Vaughan et al. [12] analysed "Mental Health Measurement in the Post-COVID-19 Era", assessing the psychometric properties of the DASS-21 among both athletes and non-athletes, thereby enhancing the understanding of mental health in athletes and enabling comparisons with the general

population. Adhikari et al. [13] investigated the correlation between the DASS-21 and the Self-Efficacy Scale among postgraduate students and found significant connections between the two assessments. Peters et al. [14] compared the DASS-21, PHQ-8, and GAD-7 in a virtual behavioural health care context, offering insights into how these tools categorize symptom severity among adults facing mental health challenges. Jain et al. [15] examined the occurrence of mental distress and addictive behaviours in medical undergraduates, employing the DASS-21 to evaluate stress-related issues in this student group. Arusha and Biswas [16] researched the prevalence of stress, anxiety, and depression linked to examinations among youths in Bangladesh, shedding light on how sociodemographic and lifestyle factors influence mental health. Shaw et al. [17] evaluated the properties of the DASS-21 among adolescents in Australia, investigating its structure and relevance across different age segments within this demographic. Camilleri et al. [18] Analysed the effects of COVID-19 and coping mechanisms on the mental well-being of university students, stressing the importance of services aimed at supporting mental health for college students. Wang and Du [19] assessed the impact of a mental health education course for college students in mitigating psychological distress and academic burnout among medical scholars. Khan et al. [20] explored the mediating role of positive psychological attributes and study skills on examination-related anxiety among Nigerian university students, emphasizing the relationship between psychological traits and academic performance. Duraku et al. [21] researched various aspects of mental health, study habits, social support, and obstacles to obtaining psychological assistance among students in Kosovo, highlighting the critical role of mental health resources in higher education. Munoz et al. [22] investigated the factors related to anxiety, depression, and stress levels among high school students, concentrating on how these elements correlate with academic success. In examining Yoga Attitudes among College Students, Mahato and Das [23] conducted a study focused on Mental well-being in relation to gender, institution, and residence, deriving insights from Purulia district, West Bengal. The primary goals of this research are to assess the positive mental well-being present among students. The researchers gathered responses using the PMH scale from 513 participants. The ultimate conclusion of the study stresses the necessity for comprehensive mental health strategies within educational environments by showcasing consistent levels of positive mental health across genders, institutions, and various living situations. Adhikari et al. [13] revealed distinct relationships among anxiety, depression, stress, and self-efficacy, illustrating differing patterns between arts and science students. Mahato et al. [24] examined the link between academic resilience and internet addiction among undergraduates in Purulia District, West Bengal, highlighting students' resilience despite challenges posed by internet dependency. Sutradhar et al. [25] conducted a study where Mahalanobis Distance is used to compare the differences between two groups of postgraduate students' levels of self-efficacy, depression, anxiety, and stress. Differences between student groups are insignificant for Self-Efficacy, Depression, Anxiety and Stress taken together as a bunch.

3. Objectives of the Study

1. To find out the levels of mental health, anxiety, stress, depression and Smartphone addiction.
2. To compare the dynamical nature of the variables according to dichotomous groups (male/female, rural/urban, science/social science, science / language and social science/language).

4. Methodology of the Study

Method: The Descriptive Survey approach was used in the current study.

Population: This Survey comprises all undergraduate students enrolled in the various college of West Bengal.

Sample and Sampling Techniques: Stratified random sampling was used to get responses from undergraduate students in 2004.

Tools used: Here the three scale are used, which are: 1. DASS-21 developed by Lovibond and Lovibond in 1995 [26] later it was developed by Gomez et al. 2014 [27]; Osman., et al., 2012 [28] in brief version, 2. Smartphone Addiction scale is developed by Kwon et al., 2013 [29]. 3. Positive Mental Health is Developed by Lukat et al., 2016 [30].

Statistical Technique used: Descriptive Statistics like Mean, SD, are calculated to get an idea about measures, Path Diagram is used to show the valid consideration of

the structure or frame of the study. Correlation Coefficient are calculated to study the relationships. Percentages of level wise respectively measures are calculated. X^2 – test also administered to compare level wise Anxiety, Stress, Depression, Smartphone Addiction and Positive Mental Health. Mahalanobis Distance is Calculated to assess the dynamic nature of the variables taken together as an unit. MS-Excel, SPSS-26, JASP, MATLAB 2021b all used to calculate above mentions measures.

5. Results and Discussion

Figure 1 represents the path diagram of the measures latent variables for Anxiety (An), Stress (St), Depression (De), Smartphone Addiction (SAS) and Positive Mental Health (PH1). Following features of the path diagram are found:

- i. Factor loadings of all the items of each scale are significant and magnitudes are satisfactory.
- ii. Scale variances and covariances are small but significant except Stress-Positive Mental Health. Covariances for Stress-Positive Mental Health was too small and insignificant.
- iii. Residual variances are lower except Smartphone addiction.

It may be opined from the results that the structure may be considered for present research.

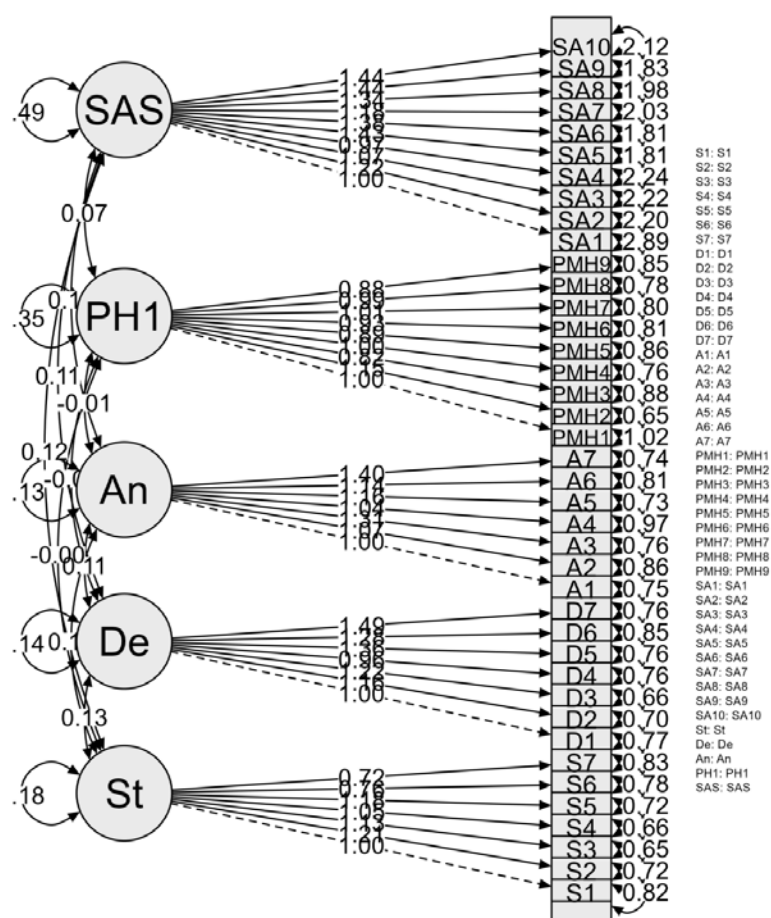


Figure 1. Path Diagram for Anxiety, Stress, Depression, Smartphone Addiction and Positive Mental Health

Table 1. Descriptive Statistics for Anxiety, Stress, Depression, Smartphone Addiction and Positive Mental Health

Descriptive Statistics			
	Mean	Std. Deviation	N
Anxiety	16.94	7.483	2004
Stress	17.21	7.471	2004
Depression	15.63	7.797	2004
SA	32.95	9.893	2004
PMH	16.10	5.847	2004

From the descriptive statistics, Mentioned in Table 1, illustrated the facts as follows: Anxiety (M = 16.94, SD = 7.483, N = 2004) which is severe; Stress (M = 17.21, SD = 7.471, N = 2004) which is Mild; Depression (M = 15.63, SD = 7.797, N = 2004) Which is Moderate ; Smartphone Addiction (M = 32.95, SD = 9.893, N = 2004) which is Moderate; and Positive Mental Health (M = 16.10, SD = 5.847, N = 2004) Which is also in moderate.

Above mentioned results showed that the group 2004 students had a tendency of severe Anxiety but mild Stress but they all moderately Depressed and Smartphone Addicted. Overall Positive Mental Health of the Students may be considered as moderate. Also, it may be opined that SD's od respective measure were satisfactory.

6. Correlation

Table 2. Coefficient of Correlation between Different Variables

Correlations						
		Anxiety	Stress	Depression	SA	PMH
Anxiety	Pearson Correlation	1	.537**	.531**	.265**	-.041
	Covariance	55.991	29.996	31.004	19.636	-1.786
Stress	Pearson Correlation	.537**	1	.527**	.302**	.021
	Covariance	29.996	55.823	30.721	22.333	.898
Depression	Pearson Correlation	.531**	.527**	1	.287**	-.113**
	Covariance	31.004	30.721	60.792	22.139	-5.151
SA	Pearson Correlation	.265**	.302**	.287**	1	.152**
	Covariance	19.636	22.333	22.139	97.875	8.772
PMH	Pearson Correlation	-.041	.021	-.113**	.152**	1
	Covariance	-1.786	.898	-5.151	8.772	34.187

**, Correlation is significant at the 0.01 level (2-tailed).

- The correlation table reveals that the Anxiety is positively significantly correlated with Stress, Depression, Smartphone Addiction but negatively Correlated with Positive Mental Health which is not Significant.
- Stress shows positively significant with Anxiety, Depression, Smartphone Addiction and Positive Mental Health but in Positive Mental Health is not Significant.
- Depression is positively correlated with Anxiety, Stress, Smartphone Addiction but negatively Correlated with Positive Mental Health.
- Smartphone Addiction Positively Correlated with Anxiety, Stress, Depression and Positive Mental Health.
- Positive Mental Health is negatively Correlated with Anxiety, positively in stress which are not significant, but negatively and significantly correlated with Depression, and positive Correlated with Smartphone Addiction.
- Coefficient of Correlation is represented by Table 2 From table following conclusion may be drawn.
- Considering the above-mentioned facts may be opined that Anxiety, Stress, Depression and Positive Mental Health had influence on Smartphone Addiction.

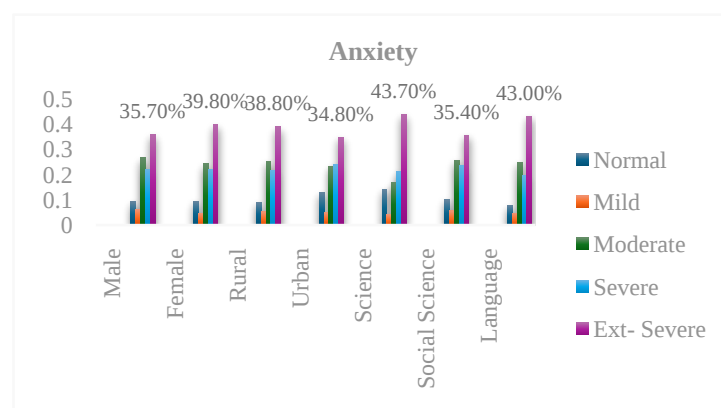
Figure 2. represents different level of anxiety for different variables. It is interesting to note that extremely severe Anxiety was found for all the cases.

Figure 3, Represents different level of stress for different variables. It can be seen from Figure 3, that mild stress was found for higher percentage of students followed by moderate level of stress.

From Figure 4, It is found that male and female students are dominated by moderated Stress. Similar results was found for rural and urban students. When stream of study is considered it was found that students are dominated by mild stress.

From Figure 5, it may opined that for all the cases students are moderately addicted with smartphone. Also, a remarkable tendency of severe addiction also found for all the cases.

Figure 6, showed the level of Positive Mental Health for different variables and for all the cases moderate level of Positive Mental Health but a remarkable number of students with high level of Positive Mental Health.

**Figure 2. Comparison among different Variables for different level of Anxiety**

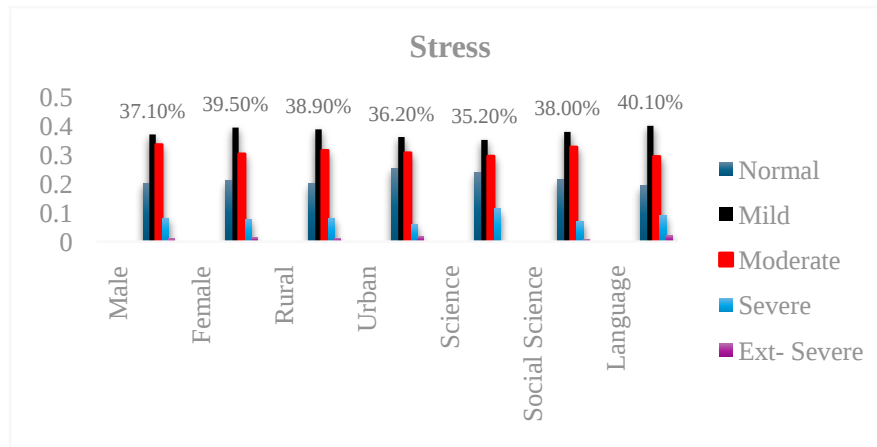


Figure 3. Comparison among different variables for different level of Stress

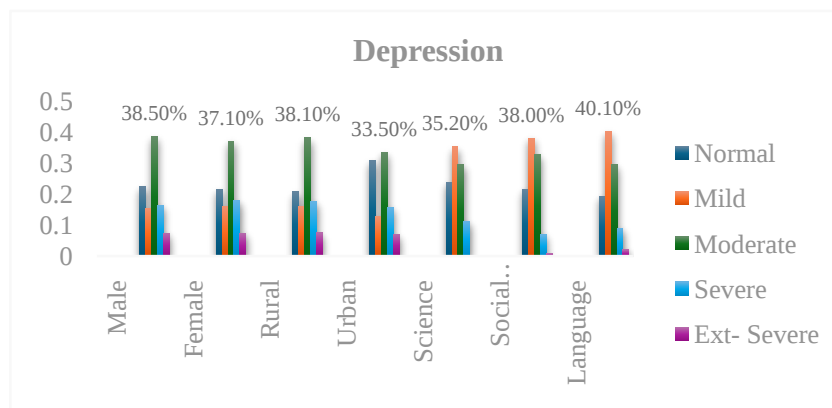


Figure 4. Comparison among different variables for different level of depression

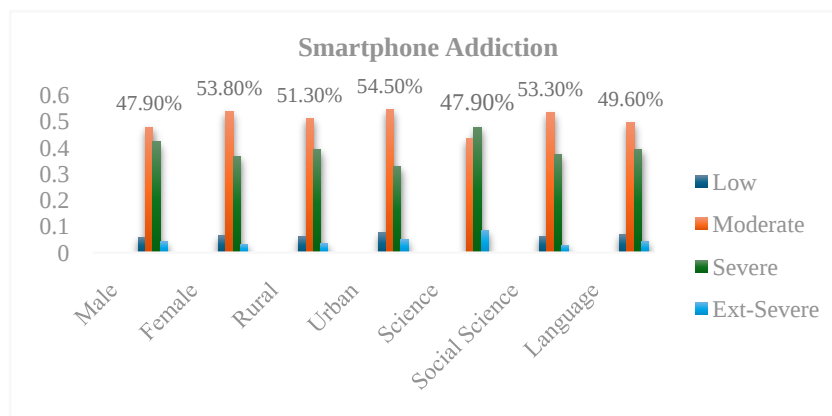


Figure 5. comparison among different variables for different level of Smartphone Addiction.

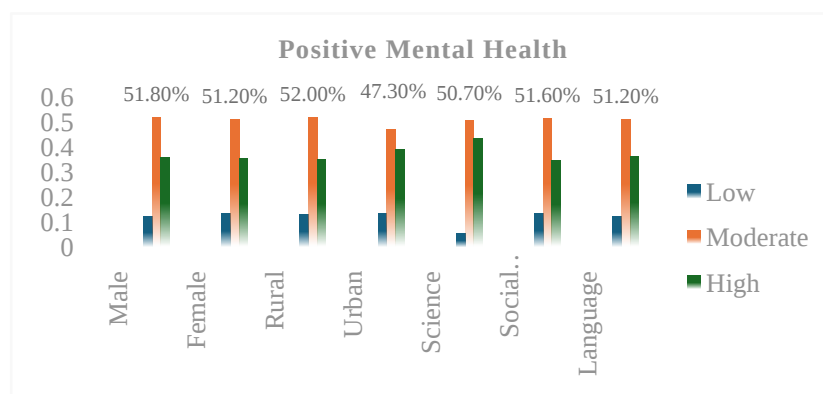


Figure 6. comparison among different variables for different level of Positive Mental Health

Table 3. Represents the dichotomous variable of Mahalanobis Distance

Dichotomous Variables	MD
Male vs Female	0.1410
Rural vs Urban	0.2047
Science vs Social Science	0.4722
Science vs language	0.4275
Social science vs Language	0.0331

Table 3, Results showed that in cases of a branch gathered from five dependent variables, including anxiety, stress, depression, positive mental health, and smartphone addiction, Mahalanobis distance between mentioned dichotomous variables does not reflect discernible differences between the nature of groups.

7. Major Findings of the Study

According to this study following finding may be considered for making conclusion.

1. Path analysis showed the validity of the consideration of variables.
2. Descriptive statistics showed the tendency of the data collected. All the measures except Anxiety showed moderate tendencies but tendency of Anxiety is severe.
3. Between Depression and Positive Mental Health, a significant negative correlation was found. For majority the other cases, significant positive correlation were found.
4. For level wise study of Anxiety, it was found that all the variables (Male, Female, Rural, Urban, Science, Social science and Language) showed extremely severe tendency.
5. For Stress, mild level tendency were found.
6. For Depression, moderate tendency for male, female, rural, and urban students but mild level tendency for stream of study.
7. For Smartphone Addiction moderate level and severe level tendency were found for all the categories.
8. For Positive Mental Health moderate and high level of tendencies were found among the students.
9. All the values of MD are less than one (1). It may be opined that, the difference between dichotomous variables, when five variables (Anxiety, Stress, Depression, Smartphone Addiction and Positive Mental Health) taken together as a set of variables, was statistically in significant.

So, there was no difference between the dynamical character for the dichotomous variable.

➤ Implications for Educational and Mental Health Systems

The findings of the study, which investigated mental health challenges among undergraduate students in West Bengal, offer critical insights for educational and mental health systems¹. The data, which revealed a demographic-wide vulnerability, must be considered in light of contemporary research on student well-being.

• High Prevalence of Severe Anxiety and its Educational Impact

The most striking result was the overall severe tendency

of Anxiety ($M = 16.94$) across the sampled students. This was further substantiated by the finding that an extremely severe level of Anxiety was reported for all dichotomous variables, including male, female, rural, urban, and all three study streams (Science, Social Science, and Language).

• Implications for Education:

Academic Performance: Current research consistently links high anxiety to impaired cognitive function, memory, and concentration, which can significantly hinder academic performance and lead to higher dropout rates.

Required Interventions: The pervasiveness of severe anxiety strongly suggests that individual counseling alone would be insufficient. A comprehensive, campus-wide approach was indicated, involving embedded mental health professionals in academic departments and training faculty to recognize and refer students exhibiting signs of extreme distress.

The Role of Smartphone Addiction (SA) and its Co-occurrence.

The study found a moderate level of Smartphone Addiction ($M = 32.95$), which exhibited a significant positive correlation with Anxiety, Stress, and Depression. This interconnectedness was deemed so important that it was opined that the mental health variables and Positive Mental Health all influenced SA. SA also showed moderate and severe tendencies across all demographic categories.

• Implications for Mental Health Services:

Targeted Treatment: Treatment protocols for Anxiety and Depression should be adapted to specifically address co-occurring problematic technology use. Current research frames SA not merely as a habit, but as a potential behavioral addiction that requires skills training in emotion regulation and alternative coping mechanisms to replace reliance on the device.

Prevention and Policy: University policies may be needed to promote responsible device use, such as designated “device-free” study zones or wellness campaigns that highlight the impact of excessive screen time on sleep and social connection.

• Resilience Factors: Positive Mental Health (PMH) and its Protection Against Depression

Despite the high levels of distress, the overall PMH ($M = 16.10$) was moderate, with a remarkable number of students reporting a high level. Critically, a significant negative correlation was established between Depression and PMH.

Implications for Wellness Programming:

Strengths-Based Approach: The negative correlation suggests that increasing positive psychological resources (e.g., self-esteem, life satisfaction, emotional stability—components of PMH) could be a buffer against depression.

Programming Focus: Intervention efforts should strategically focus on bolstering PMH through workshops on mindfulness, gratitude practices, and building social support networks, rather than focusing solely on symptom reduction.

• Uniformity of Impact Across Demographics

The study's conclusion, supported by Mahalanobis Distance values less than one, was that the combined impact of all variables was gender, residence, and stream independent.

• Implications for Resource Allocation:

Non-Discriminatory Policy: This uniformity simplifies

resource planning. Mental health services and educational policy interventions were indicated to be equally necessary and relevant for all groups of undergraduate students. Resources should not be disproportionately allocated based on assumptions that one demographic group (e.g., females or urban students) was inherently more vulnerable than another in the overall structure of mental health challenges.

8. Conclusion

From findings of this study, it may be concluded that variable selection is valid and Positive Mental Health is significantly and oppositely oriented to depression. Majority of the undergraduate students had moderate and high level of Positive Mental Health. Interesting to note that, the Smartphone Addiction related highly to all other variables. Overall impacts of Anxiety, Stress, Depression, Smartphone Addiction and Positive Mental Health over different dichotomous variables are similar. As a result, it may be opined that total impact of those variables are gender, residence and stream independent. In different cases similar results were found [24,25]

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