Psychological Status Observation Among the Medical Students using DASS21

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ABSTRACT

Background

The psychological disorders like depression, anxiety, and stress seem significantly more prevalent in medical students than in general people nowadays. The medical courses with tedious academic activities raise this mental distress among them. In addition, demographic and biological factors have a citable impact on mental illness. Thus, to analyze these health issues, many studies have been done based on the DASS- Depression Anxiety Stress Scale, where DASS21 comprises 21 questionnaires.

Objectives

To highlight the correlation between demographic features and DASS21 attributes. Determining the severity of depression, anxiety, and stress in medical students, and observing the percentage-wise relation between preferred features – BMI, Blood Pressure, and Blood Group – and DASS21 attributes.

Methods

An online survey was conducted on Uttara Adhunik Medical College undergraduate students in November 2023. Students' demographic data, biological factors information, and responses from DASS21 questionnaires were taken in this survey. Further analysis of results and visual observation has been done through online and offline spreadsheets.

Result

Following the correlation coefficient test, students' age and blood pressure negatively relate to DASS attributes; however, BMI is correlated positively with depression, anxiety, and stress. The severe prevalence rate of depression- 59%, anxiety- 72%, and stress- 53%, where females are more affected. The students who belong to the O and B blood groups as well as the overweight and obese students are more affected although most of them are healthier; nevertheless, depressed, anxious, and stressed students are mostly normotensive.

Conclusion

The present study highlights that most of the undergraduate medical students of UAMC, especially females are suffering from depression, anxiety, and stress issues. These psychological disorders are highly associated with their BMI, Blood Pressure, and Blood Groups.

Keywords

DASS21; psychological disorders; demographic factors; biological factors, correlation coefficient.

INTRODUCTION

Psychological illnesses are a common health problem among all medical students; thus, much attention has been given to overcoming these health issues in recent years.[1-4] To become well-trained physicians and provide convenient services to patients, medical students undergo pressure and struggle with stressful academic activities and training periods from the beginning of their medical lives.[5-8] More importantly, several factors are liable to develop emotional disturbances, such as regular assessments in a frequent summative and formative method in a competitive academic environment,[9,10] study curriculum,[11] student abuse[12], teaching media changing,[13,14] fear of exam failure,[15] financial matters, residence, loneliness, lack of proper sleep,[16-20,] and exposure to patients' sufferings.[21]

Psychological well-being is compromised due to obesity, and the enormous burden that obesity can inflict has only been fully identified in the last couple of years.[22,23] High blood pressure denotes a physical sign of psychological disorders like anxiety and stress, and many studies have been done where it is found to be high in psychological distress.[24-27] Antigens present on the red blood cell membrane determine the ABO blood group system and associate with psychological disorders, as observed in previous

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clinical studies.[28-33] The remarkable findings are- that certain mental illnesses seem to be affected by blood group genetics.[34,35]

Depression, a significant health issue among medical students, is the most prevalent contributor to the worldwide disease and is characterized by depressed and worried mood, appetite and insufficient sleepiness, poor concentration, feelings of guilt, diminished energy, lack of enjoyment, and losing interest in joyful activities.[36-38] According to a study, the prevalence of depression is 54.3% in our country.[39] Anxiety is an emotional status accompanied by tense feelings, excessive worry, and subsequently physical symptoms changes including elevated staged blood pressure, and has a profound impact on medical life and, therefore, needs to improve the students' overall academic performance through proper counseling.[40]

Stress is identified as abnormal when it disrupts regular life and causes symptoms like irritation, lack of concentration, or exhaustion.[41] It is established that because of stress, learning, and cognitive functions are affected and have an inconvenient outcome on the psychological prosperity of medical students.[42] Stress causes hypertension in young adults.[43] The prevalence of stress rates significantly has been observed in Asian countries, such as 56%, 51.3%, 62.4%, and 61.3% for Malaysia[44], India[45], Egypt[46,] and Iran[47], respectively.

Various studies have been done to observe the correlation of DASS attributes with age, BMI, Blood Group, and Bloop Pressure separately. Nevertheless, one of the notable findings of this study is that all these factors together are correlated through the correlation coefficient test with depression, anxiety, and stress. Also, this study depicts some significant information regarding the psychological disorders of undergraduate medical students of UAMC (Uttara Adhunik Medical College).

MATERIALS AND METHODS

Research Design

A cross-sectional study was conducted on the prevalence of depression, anxiety, and stress, as well as the associated factors in a group of undergraduate medical college students in November 2023. The chosen students were enrolled in the MBBS course from the different batches of Uttara Adhunik Medical College, Dhaka. The verbal consent was taken for this online survey from the students who would like to participate. The objectives of this research informed the students, assured that privacy and confidentiality would be maintained, and they were entitled to participate in this study or withdraw at any time without reprisal. Among the 350 medical college students, 300 students were ensured to participate and accomplish their surveying tasks.

Questionnaires

For conducting this survey, three types of information were gathered from participants, they are- demographic data, biological information, and responses from the DASS21 questionnaire. The demographic data was comprised of age, gender, weight, height, and BMI (calculated from weight and height), and biological information included blood pressure (systolic and diastolic in mm) and blood group (A+, A-, B+, B-, O+, O-, AB+ and AB-). Besides, DASS21 consisted of questions regarding depression, anxiety, and stress (rating from 0 to 3, depending on the statements).

Data Collection & Analysis

A Google Form was developed to conduct this online survey on 350 participants. Students had to mention their names and mailing addresses, which were kept confidential, and this information was preserved for consulting with the professional if any significant emotional difficulties were identified. They had to provide their height (in Inches) and weight (in Kg), select their blood group and input their resting blood pressure status (systolic and diastolic). The next section comprised three subgroups, and each subgroup included seven questions (according to the DASS21 questionnaire regarding depression, anxiety, and stress). Students were asked to answer those statements by choosing a particular rating from 0 to 3 (where those rating meanings- 0: did not apply to me at all, 1: applied to me to so some degree or some of the time, 2: applied to me to a considerable degree or a good part of the time and 3: applied to me very much or most of the time). From the summation of each subgroup's ratings, the severity level of depression, anxiety, and stress were determined. Following the past research[48], the rating was categorized as five types of severity levels for DASS attributes; Table 1 shows these severity levels with ratings.

Table 1: DASS21 rating based on severity.

Severity	Depression	Anxiety	Stress
Normal	0-4	0-3	0-7
Mild	5-6	4-5	8-9
Moderate	7-10	6-7	10-12
Severe	11-13	8-9	13-16
Extremely Severe	14+	10+	17+

After completing this survey, the students' BMI was calculated from weight and height data. Based on the students' data, further analysis was conducted; the explanation is available in the following sections- Result and Discussion.

RESULT

Demographic features and DASS attributes

In this study, the demographic data is comparable based on male and female participants. According to Table 2, the mean values of the variables – age, height, weight, and BMI – of the males are higher for female students.

Table-2: Demographic data based on gender.

Gender	Mean Age (Years)	Mean Height (Inches)	Mean Weight (Kg)	Mean BMI (Kg/m^2)
Male	23	66.50	68.51	24.05
Female	22	62.64	58.66	23.29

This research identifies the relation between all attributes by the correlation coefficient test; Table 3 illustrates this test results. According to this table, the students' age is not proportionately increased DASS attributes – Depression, Anxiety, and Stress – severity. nevertheless, this research highly prefers observing the relationship between BMI, Blood Pressure, and Blood Group (due to categorical attributes, the correlation coefficient of the Blood Group wasn't measured) and DASS attributes.

From the correlation coefficient, this research finds the BMI of students has a positive relationship with the DASS attributes though the correlation coefficient score ranges near about from 0.14 to 0.19. On the contrary, there is a negative relation between Blood Pressure (systolic and diastolic) and DASS attributes; for the Systolic BP and Diastolic BP, the correlation coefficient scores range from -0.11 to -0.18 and from -0.15 to -0.19, respectively. In addition, there are strong positive relations between DASS attributes and each other, and there are proportional relations between students' Depression, Anxiety, and Stress.

Table-3: Correlation coefficient test of demographic features, BP, and DASS attributes.

	Age	BMI	Systolic Blood Pressure	Diastolic Blood Pressure	Depression	Anxiety	Stress
Age	1.000	- - -	- - -	- - -	- - -	- - -	- - -
BMI	0.021	1.000	- - -	- - -	- - -	- - -	- - -
Systolic Blood Pressure	0.026	0.171	1.000	- - -	- - -	- - -	- - -
Diastolic Blood Pressure	0.023	0.135	0.436	1.000	- - -	- - -	- - -
Depression	-0.121	0.188	-0.124	-0.168	1.000	- - -	- - -
Anxiety	-0.178	0.173	-0.177	-0.188	0.509	1.000	- - -
Stress	-0.132	0.143	-0.117	-0.151	0.573	0.567	1.000

Note: The Kendall Tau formula has been used to accomplish the correlation coefficient test. A score above 0 to 1, below 0 to 1 and 0 means the positive, negative, and neutral relationship, respectively between the attributes.
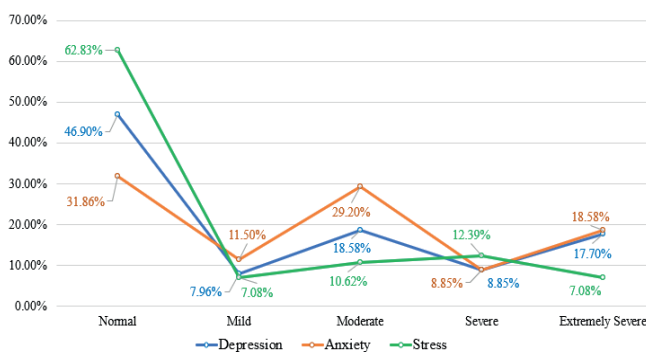
Severity of DASS attributes

The DASS attributes are classified into five categories based on their severity level. Table 4 shows the DASS attributes' severity level on 300 medical students.

Table-4: Severity of Depression, Anxiety, and Stress among the Participants.

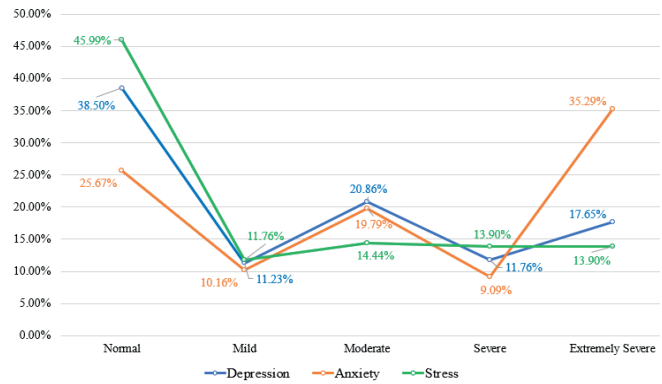| Severity	Depression	Anxiety	Stress
Normal	41.67%	28.00%	52.33%
Mild	10.00%	10.67%	10.00%
Moderate	20.00%	23.33%	13.00%
Severe	10.67%	9.00%	13.33%
Extremely Severe	17.67%	29.00%	11.33%

Note: The percentage-wise values of the column-Depression, Anxiety, and Stress are calculated at 100%, particularly for each column.

This study also observed the severity of DASS attributes on males and females individually. Figure 1 illustrates the severity of depression, anxiety, and stress among the 113 male students.

Figure-1: Male students' depression, anxiety and stress severity.

Besides, the severity ratio of DASS attributes for female students is distinguishable. Figure 2 highlights the severity of depression, anxiety and stress among the 187 female students.

**Figure-2:** Male students' depression, anxiety and stress severity.

BMI, BP, and BG vs DASS attributes

This research labels the Blood Groups by considering their basic Blood Group type (i.e. the BG "A" comprises A+ and A- BG).[35] Table 5 presents the information of the participating students based on their blood group type.

Table-5: Summarized data of students' Blood Group ratio.

| Blood Groups	Number of Students	Percentage
A	67	22.33%
B	101	33.67%
O	102	34.00%
AB	30	10.00%
Total:	300	100%

Following the earlier research, this study denotes the severity label- Normal as absent and Mild, Moderate, Severe, and Extremely Severe as present.[35] Figure 3(a), 3(b), and 3(c) demonstrate the relation between Blood Group and DASS attributes – Depression, Anxiety, and Stress – presences, respectively.
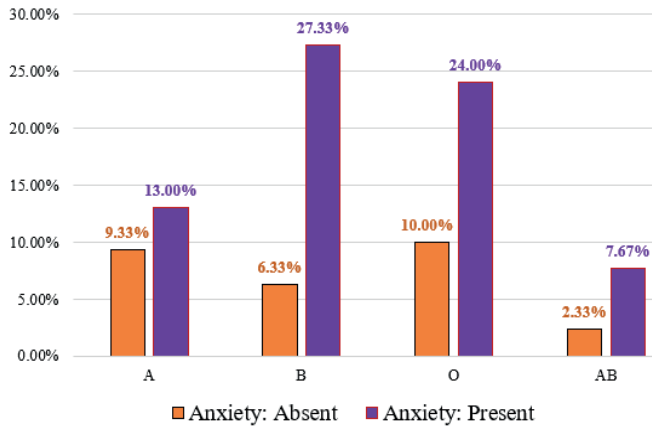
Figure-3 (a): Relation between Blood Group and Depression presence.
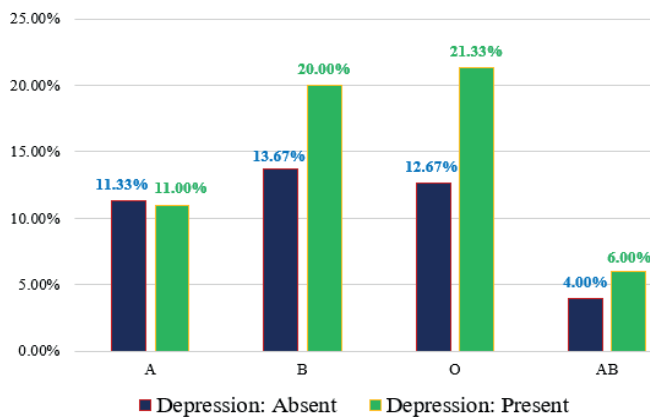
Figure-3 (b): Relation between Blood Group and Anxiety presence.
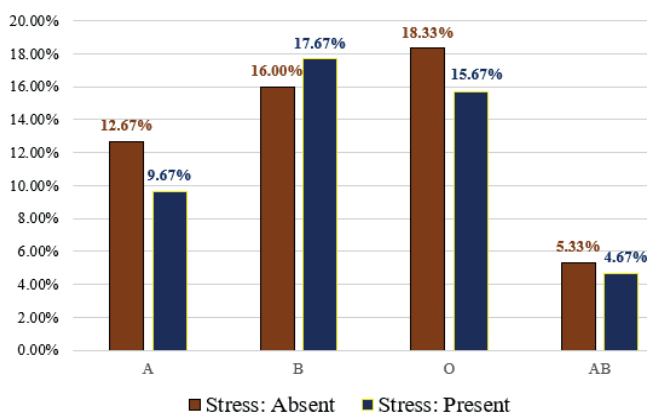
Figure-3 (c): Relation between Blood Group and Stress presence.

In this study, the BMI of students is categorized into four types. Table VI shows the BMI ratio for the male,

female, and combined (for all students). Also, the relation between BMI and DASS attributes has some significant findings. Figure 4(a), 4(b), and 4(c) highlight the relation between BMI and Depression, Anxiety, and Stress presence, respectively.

In this study, the BMI of students is categorized into four types. Table 6 shows the BMI ratio for the male, female, and combined (for all students). Also, the relation between BMI and DASS attributes has some significant findings. Figure 4(a), 4(b), and 4(c) highlight the relation between BMI and Depression, Anxiety, and Stress presence, respectively.

Table-6: Ratio of BMI among the male, female, and combined participants.

Category	Both	Male	Female
Underweight	8.33%	7.08%	9.09%
Healthy	58.34%	53.98%	60.96%
Overweight	27.00%	32.75%	23.53%
Obesity	6.33%	6.19%	6.42%

Note: The percentage-wise values of the column- Male, Female, and Both are calculated at 100%, particularly for each column.
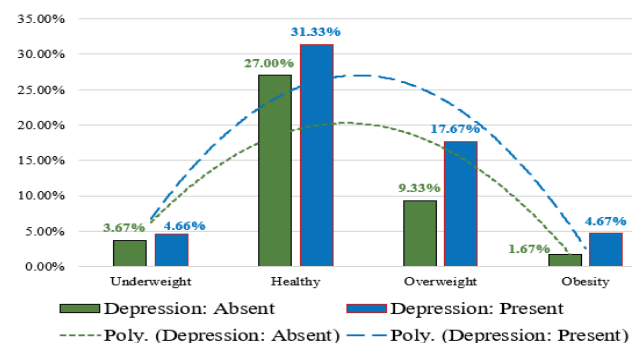
Figure-4 (a): Relation between BMI and Depression presence.

Figure-4 (b): Relation between BMI and Anxiety presence.

Figure-4 (c): Relation between BMI and Stress presence.

This study assorted four types of Blood Pressure severity through the Systolic BP and Diastolic BP result analysis. Table 7 depicts the ratio of BP severity for the male, female, and combined students. In addition, Figures V(a), V(b), and V(c) highlight the relation between BP severity and Depression, Anxiety, and Stress presence, respectively.

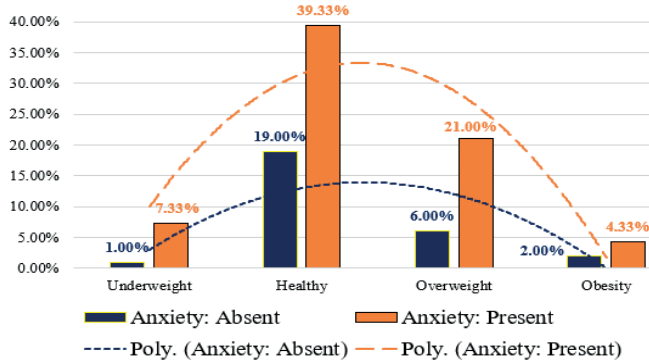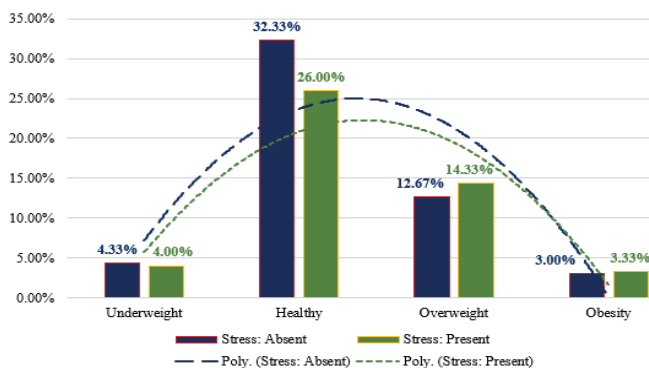**Table-7:** Blood Pressure severity among the male, female, and combined participants.

Category	Both	Male	Female
Normal	75.33%	61.06%	83.96%
Elevated	20.00%	34.51%	11.23%
HTN Stage 1	2.00%	3.54%	1.07%
HTN Stage 2	2.67%	0.88%	3.74%

Note: The percentage-wise values of the column- Male, Female, and Both are calculated at 100%, particularly for each column.

DISCUSSION

Observe Demographic features and DASS attributes

From this study, it can be observed that the mean ages and BMI for the male and female participants do not have notable variation. Male participants have a higher demographic variable than the female participants though the number of females is more than males. In addition, through the correlation coefficient analysis, this study also detects the positive impact of BMI on Depression, Anxiety, and Stress where the Blood Pressure (systolic blood pressure and diastolic blood pressure) has an inversed relation with those three attributes.

Analyze Severity of DASS attributes

This study identifies a significant number of remarkable and practical findings by analyzing the impact of depression, anxiety, and stress among the 300 undergraduate medical students. Approximately 59% of students are suffering from depression issues, whereas around 29% are affected on severe and extremely severe levels. Besides, another worth mentioning point is- that almost 62% of female students have found who are depressed in their life, which is considerably greater than the male students' depression ratio- about 53%. However, the percentage of severely and extremely severely affected ratio – for males nearly 27% and females roughly 30 – is similar for depression.

Furthermore, the proportion of anxiety presences (mile, moderate, severe, and extremely severe) is relatively higher- 72% than the depression-affected ratio of participants. Following the earlier consequence of depression, anxiousness has also been found more for females than males; around three-fourths of females are facing this mental illness; in fact, about 45% of females are undergoing severe and extremely severe anxiety. However, the amount of elevated (mild and moderate) states for the male participants is significantly higher – almost 41% – than the female participants' ratio- nearly 30%.

On the other hand, the aggregation of stress presence in participants is comparably lower than the presence of depression and anxiety. The overall ratio of normal stressed participants- approximately 53%. Still, in this case, 54% of females are having stress symptoms whereas the males are more positive on normal stress- nearly 63%. Meanwhile, around 28% of females are passing through severe and extremely severe

anxiousness, which is also above the ratio of males' anxiousness ratio- almost 20%.

The relatively identical pattern of Depression, Anxiety, and Stress axes is another citable finding in this study. The axes of Depression, Anxiety, and Stress start from the higher values on normal severity levels. Those axes are declining parallelly toward mild and severe levels; nevertheless, they are rising upward for the moderate and extreme severe levels. Though the number of males and females is unequal, the graphical analysis demonstrates a similar trend of DASS attributes' severity levels.

Explore Relation on BMI, BP, and BG vs DASS attributes

Among the 300 participants, 102 and 101 students belong to the B and O blood groups, respectively, and this amount is significantly higher than the A and AB blood group participants. This study has explored the presence of depression in O (21.33%), B (20%), and AB (6%) blood group students is above their depression absence ratio whereas the absence ratios of O and B blood group students are quite fewer comparatively AB blood group. Besides, the depression absence amount is slightly above for A blood group participants. Also, the presence of anxiety in all blood group participants is relatively higher than their absence ratios. More than half of medical students (51.33%) suffering from anxiousness belong to B and O blood groups; however, the anxiety absence amount is only 16.33% combinedly in these two blood groups. In addition, the Anxiety severity is also notably higher for the A (13%) and AB (7.67%) blood groups' students than their absence ratio- 9.33% and 2.33%, respectively.

This research has observed that medical students suffer from depression and anxiety issues; however, their stress symptoms are comparatively moderate than those issues. The ratio of stressless or stress-avoidance participants is marginally above that of stressed students for the A, O, and BG participants. However, B blood group students' anxiety is above a little (17.67%) than anxiety-free students (16%).

Through analyzing the BMI severity, this study has identified that most of the students are healthy (58.34%), whereas female students seem lively, and their percentage is comparatively above the male students. Similarly, the overweight (27%) issue has been higher for males than females. Besides, this study spots the overall amount of underweighted (8.33%) and obese (6.33%) students are significantly fewer than the rest

two categories; nevertheless, in this case, the number of females is above the males.

This study has mentioned earlier that the participants' BMI has light positive correlations with DASS attributes. From the graphical analysis, this observation is shown in the Result section. Although more than half of the participants are healthy, the depression presence ratio is still higher for healthy (31.33%) participants than for depression-less students (27%).

Also, the underweight, overweight, and obese participants are depressed. The polynomial trendlines of depression status are rising from the Underweight BMI state and dropping down towards the Obesity BMI state. Since there is a slightly positive relation between Depression (0.188) and BMI, thus, the trendlines- especially the Depression Present one - rise with the BMI value increments, and have spotted picked on the almost middle of Healthy and Overweight position, and failing down Obesity by passing Overweight state. In addition, a moderate dissimilation has been found of those two polynomial trendlines for Depression Present and Depression Absent, where Depression Present is positioned top.

The relation of BMI with Anxiety seems almost similar to earlier consequences of depression. From Underweight to Obesity, all categories of students are suffering from anxiousness issues. More notably, the ratio of anxiety presence for healthy students is more than double (39.33%) than anxiety-free (19%) students, whereas this ratio is more than triple (21%) than anxiety-free (6%) for overweight students. Due to having a positive relationship with BMI (0.173), the trendline of Depression Present is climbing from the Underweight state, declining to the Obesity state and the picked position is similar to depression. However, there is a noticeable variation between Anxiety Present and Anxiety Absence polynomial trendlines where the Anxiety Present trendline curve is placed above. On the contrary, the proportion of stress-free participants (32.33%) is more than the stressed participants (26%) for the Healthy students, and this factor is also found for the underweighted participants. Besides, the ratio of stressed participants is higher for overweight and obese students. However, the differences between Stress Present and Stress Absent percental-wise amount on all BMI categories are comparatively less than the depression and anxiety. In addition, since there is a low positive relation between Stress and BMI (0.143);

therefore, the Trendlines of stress look almost similar to earlier DASS attributes. However, these two polynomial curves are closed and cross each other in the middle of the Overweight and Obesity states.

The negative correlation coefficient test with DASS attributes and Blood Pressure depicts an anti-proportional relation between them for the 300 medical students. Thus, this research has observed that more than three-fourths (75.33%) of students' BP is normal, where females are more fit than males.

Also, the BP elevation stages seem higher for males than females, where one-fifth of participants belong to the elevated BP stage. However, the BP Hypertension Stage 1 and 2 affected students' amounts are found many little relatively rest two categories.

According to human psychological observation, the presence of depression, anxiety, and stress should be increased from Normal BP to Hypertension BP; however, the number of participants in elevated and hypertension stages is too few. For the depression presence perspective, 44.33% of students are depressed though their BP is normal. Besides, 12% of students who are in the Elevated BP stage are suffering from depression issues. However, the HTN Stage 1 and HTN Stage are relatively low; for that reason, the Depression Present trendline dropped from Normal to HTN Stage 2. In addition, the initial difference between Depression Present and Depression Absent trendline is moderate, which has crossed HTN Stage 1 and HTN Stage 2. Besides, almost a closed scenario has been detected for stress where a good number of medical students (54.67%) are anxious for those with normal BP, and the anxiety-free normal BP students are comparatively low (20.67%). Also, 14.33% of students are suffering from elevation stage BP with anxiety, whereas only 5.67% of students are identified as those who do not have anxiousness issues though they are on the elevation stage. The Anxiety Present and Anxiety Absent trendlines are similar to depression; however, the initial variation of those trendlines is quite considerable. In both cases of Depression and Anxiety, their present trendlines have remained top.

On the other hand, this study notices that 40% of normal BP or normotensive students are stressless, whereas 35.33% of normotensive students suffer from stress problems. On the elevated BP stage, the ratio of stress absent (9.33%) and stress present (10.67%) is close enough. Besides, the number of HTN Stage 1 and Stage HTN 2 students with stress present with much lower. The difference between stress absence and stress presence is very little; therefore, the pattern trendline of Stress Present and Stress Absent is almost the same. However, for this stress, the Stress Absent trendline has positioned slightly higher than the Stress Present trendline.

CONCLUSION:

This study identifies that DASS attributes are significantly higher in female medical students. Also, most participants are healthier; nevertheless, half of the participants are affected by depression, anxiety, and stress, although their anxiety is predominately higher. In addition, students who suffer from mental illness have different blood group antigens, especially observed in O and B blood group students. To alleviate this psychological distress for better students' learning activities, proper counseling must be needed.

Author's contribution:

Idea owner and Data gathering: Professor Dr Matia Ahmed

Data processing: Shah Jafor Sadeek Quaderi

Study design and manuscript writing:

Professor Dr Matia Ahmed and Shah Jafor Sadeek Quaderi

Manuscript draft approval: Professor Dr Matia Ahmed

Manuscript submitting: Shah Jafor Sadeek Quaderi

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