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Evaluation of stress and its clinical correlation among the students of Allied Health Sciences

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Abstract

Background: Stress is a key indicator affecting the psychological and physical health of students throughout the world. The current study was planned to find out depression, stress, and anxiety and their impact on obesity and different clinical markers among the students of Allied Health Sciences.

Methods: To assess stress, anxiety, and depression levels; the Depression, Anxiety, and Stress Scale (DASS- 21) was utilized. A total of 1446 individuals participated in the current research project. After assessing the BMI of students, a blood sample of two hundred and two (202) obese students were collected. Spectrophotometry, latex agglutination, and flow cytometry were employed to determine the different clinical markers.

Results: Stress was found in 63.10% population, while depression was 59.70% and the prevalence of anxiety was 61.90%. After analysis of the blood samples of students, a significant increase was seen in cholesterol and HDL, while VLDL was moderately decreased. LDL, triglycerides, and CBC showed no significant change. Random blood glucose was normal, and CRP was also found negative in all the participants. There was no significant correlation between serum lipid profile and CBC parameters during stress, anxiety, and depression in students.

Conclusion: A significant stress level was found among the students of Allied Health Sciences. It is a dire need of time to be focused on the mental health of students. Psychological counseling should be provided in the institutes for the mental well-being of the students.

Introduction

The restoration of life is seriously dependent on sustaining our internal processes in the face of a changing environment called "homeostasis" [1]. The term "STRESS" is used to present anything serious that is a threat to homeostasis [2]. The real prospect of an organism is called a stressor and the comeback to a stressor is called a stress response [2].

Stress can be a major problem for physical, and psychological health and chemical changes in the human body. Nowadays, the term stress has been used extensively in developed communities. Sometimes stress can be helpful by helping people go through situations such as exams or work deadlines [3]. When the body is under pressure, it responds in the same way that it responds to danger. Fatigue, general illness, and feeling inferior are all feelings of stress [2].

The term stress is used as a symbol of unpleasant changes in everyone's daily life, and almost decades of research prove that stress is a phenomenon that every human brain endures. Stress acts like a basic alarm system of the human body for proper response to situations, but if not responded properly then it can lead to major health problems like emotional distress [4]. Uncontrolled stress is the primary cause of most chronic diseases, and the body is frequently under constant stress while suffering from any illness or disease. So, it is very difficult to manage such conditions [5].

Amel Farooq Al Shawi *et al.,* evaluated the stress levels among medical students in their study at Al-Anbar medical university, Iraq. The researcher concluded that 77.5% of students had stressed to some extent out of which 11.5% of students were under severe stress 25% had moderate and 21.8% were undergoing mild or little stress. These results showed that stress in medical students is a serious concern. [6].

Imad Taher Abdulla *et al.,* in 2018, studied the effect of stress in medical students on their lipid profile and some other blood parameters. 20 medical students of Zakho University were included in the research and their blood samples were taken. According to the results, there was a significant increase in the levels of low-density lipoprotein (LDL), total cholesterol, very-low-density lipoprotein (VLDL), and triglycerides. But high-density lipoproteins (HDL) were seen to be decreased in stress conditions. Lymphocytes were also seen to be high in blood during stress [7]. No such study has been performed in Pakistan yet so current research work was planned to determine the stress among Health sciences students and further link it with obesity and different clinical markers.

Methods

A descriptive cross-sectional study was conducted in the department of Allied Health Sciences from November 2020 to June 2021. We applied an online self-response questionnaire, to assess stress, anxiety, and depression levels in the students. The survey was filled out by 1446 students. For the questionnaire, the depression, anxiety, and stress scale (DASS-21) was utilized. Factors involving depression, stress, and anxiety were also recorded. After assessing the BMI of 1446 students, blood samples of two hundred and two (202) obese students were collected. Glucose Random and Lipid Profiles including Cholesterol, Triglycerides, HDL, and VLDL were performed on Cobas C311 fully automated routine operation chemistry analyzer based on spectrophotometry, CRP performed by a qualitative method based on latex agglutination principle and hematological parameters (CBC) were performed on Sysmex XP-100 analyzer with the principle of electrical impedance and fluorescent flow cytometry. The results were compiled and managed in Microsoft Excel 2019. The results data were analyzed by using the statistical software SPSS.

Results

The DASS-21 questionnaire was distributed among the different departments of the Allied Health Sciences. Almost 1446 students took part in this research project to achieve a quick response. This questionnaire-based study concluded that the prevalence of stress in students of Allied Health Sciences was overall 63.1%, 31.9% of overall stressed students were under mild stress, 16.9% of students were under moderate stress and only 14.3% of students were found to be under severe stress. The depression prevalence in the students was overall 59.7%, 30.4% of overall students responded to mild depression, 6.0% of students responded to moderate depression and only 13.2% of students were found to be under severe depression. The cases of anxiety indicate that anxiety in students of Allied Health Sciences was overall 61.9%. The overall level of mild, moderate and severe anxiety was found to be 31.4%, 16.4%, and 14.0% respectively. Out of 1446 responded students of Allied Health Sciences, 63.69% were with normal BMI, 18.67% were overweight and 17.63% were obese. While in the case of 202 obese students, Overall, 63.10% of students were under stress, 61.90% of students were in depression and 59.60% of students has anxiety as shown in table 1. 47.0% of students were observed with high cholesterol values and 15.3% of students were observed with high triglycerides concentration. The level of HDL, LDL, and VLDL were also demonstrated which showed that 36.3% of students were having abnormally low HDL values, the LDL concentration was low in only 3.5% of the students and 26.7% of students were having low values

of VLDL. Glucose random and CRP were normal among all the participants (table 2).

	DASS-21 Overall Evaluation %			DASS-21 Evaluation % in Obese		
Degree	Stress	Depression	Anxiety	Stress	Depression	Anxiety
Mild	31.9	30.4	31.4	31.9	31.4	30.4
Moderate	16.9	16.0	16.4	16.9	15.1	16.0
Severe	14.3	13.2	14.0	14.3	15.4	13.2
Overall	63.1	59.7	61.9	63.1	61.9	59.6
BMI Calculation %	Normal		Overweight		Obese	
	63.69		18.67		17.63	

Table 1: DASS-21 shows the stress, depression, and anxiety level among all the participants

Parameters:	Reference Value:	Interpretation % LOW	NORMAL	HIGH
Cholesterol	< 200 mg/dl	0.0	53.0	47.0
Triglycerides	< 150 mg/dl	0.0	84.7	15.3
HDL	> 55 mg/dl	36.3	63.7	0.0
LDL	< 155 mg/dl	3.5	96.5	0.0
VLDL	< 25 mg/dl	26.7	73.3	0.0
Glucose Random	80 – 140 mg/dl	0.0	100.0	0.0
CRP	Negative	-	100.0	-

Table 2: Evaluation of Biochemical parameters in stressed Obese participants

9.5% of students had leukocytopenia and only 5.4% had leukocytosis. The neutrophils count indicates that only 3.0% of students had neutropenia and lymphocytopenia was observed in 0.5% of students and 11.4% had lymphocytosis. Monocytosis was seen in 14.8% of students and only 3.0% of students had monocytopenia. Only 6.9% of students had eosinopenia and 14.9% of students had eosinophilia. The observation of RBCs showed that 13.8% of students had low and 9.40% of students had high RBCs count. 61.9% of students had normal hemoglobin, 6.9% of students were anemic and 31.2% of students were considered to have polycythemia. HCT level of 41.6% of students was high and 10.40% were low HCT level in whole blood, MCV of 33.2% of students was at the high end and 8.9% of students had low MCV, 16.8% of students were observed with low MCH and 22.8% students were with high MCH and MCHC count of 53.5% students were low. 11.9% of students had thrombocytopenia and 2.5% of students showed thrombocytosis (table 3).

Parameters:	Reference Value:	Interpretation % LOW	NORMAL	HIGH
WBC	4.5 - 10.5 10^9/L	9.5	85.1	5.4
RBC	4.5 – 6.0 10^12/L	13.8	76.8	9.4
HB	12. – 16 g/dl	6.9	61.9	31.2
HCT	40 – 50 %	10.4	48.0	41.6
MCV	80 – 98 fl	8.9	57.9	33.2
MCH	27 – 31 pg	16.8	60.4	22.8
MCHC	32 – 36 g/dl	53.5	46.5	0.0
Platelets	150 – 450 10^9/L	11.9	85.6	2.5
Neutrophils	40 – 80 %	3.0	97.0	0.0
Lymphocytes	15 - 45 %	0.5	88.1	11.4
Monocytes	2 – 10 %	3.0	82.2	14.8
Eosinophils	2 – 6 %	6.9	78.2	14.9

Table 3: Evaluation of hematological parameters among stressed obese participants

Discussion

According to the results of the current study, the students were having a significantly high level of depression, anxiety, and stress. A total of 1446 students participated in the survey, and the total percentage of students with depression was 59.70%. Out of this 30.40% of students were under mild depression, 16.00% of students were under moderate depression and 13.20% of students were in severe depression.This result was quite similar to those of Besham Kumar et.al. (2019) who conducted research to estimate depression, anxiety, and stress among 2 universities in Karachi. According to their results, 57.6% of students were under depression, 74% of students were in anxiety and 57.7% of students were under moderate to severe levels of stress [8]. Maria Joao Oura (2020) also conducted research among Portuguese medical students. She discovered that in a total of 501 participants 49.9% of students showed significant levels of stress, out of which 20.8% of students had specifically high levels of stress which is not far from the stress score in our study which is 63.10% [9].

After the survey, we took blood samples of those students who had depression, stress, and anxiety according to the DASS scale and obese according to BMI which were 202 in number. We performed the CBC, lipid profile, CRP, and glucose random level. The level of glucose was normal in all the students. In the lipid profile, 47% of students had high cholesterol levels, and 15.30% of students had a high value of TG. HDL was seen to be decreased in 36.30% of students whereas LDL was decreased only in 3.5% of students, and VLDL was abnormally low in 26.70% of the students. The current findings were endorsed by Al Uba *et al.,* who reported a significant change in lipid profile before and during examination in 2014. They reported a significant increase in LDL, cholesterol, TG, and also in HDL. Imad Taher Abdullah *et al.,* 2018 conducted research work related to the effects of stress on lipid profile at the university of Zakho and a major increase in the value of Cholesterol, TG, LDL, VLDL, and HDL was observed which were also similar to current findings. But the values of LDL and VLDL showed a slight decrease in 3.5% and 26.7 % of students respectively [7,10]. We find no significant change in the inflammatory marker which was CRP in the current study Anna L Marshland *et al.,*. 2017 also studied the effects of stress on inflammatory markers and CRP was also included in the parameters being accessed. According to her results, there was no change in CRP before and after stress [11]. In complete blood count, the WBCs of 85.10% of students were normal, and 5.40% were having significant leukocytosis only 3.00% of students were having neutropenia. Only 0.50% of students had lymphocytopenia and 11.40% had lymphocytosis. 14.80% of students had monocytosis and

only 3.00% of students had monocytopenia. 6.90% of students had eosinopenia and 14.90% of students had eosinophilia. In the observation of red cell count, 13.80% of students had low red cell count and 9.40% of students had increased cell count. 6.90% of students were anemic and 31.20% of students were polycythemic. 41.60% of students had high HCT levels and only 10.40 % were with low HCT levels in whole blood, 33.20% of students had high MCV count and 8.90% of students had low MCV. 16.80% of students had low MCH and 22.80% of students had high MCH count. 53.50% of students had a low MCHC count. Another study reported on the association of body mass Index with hemoglobin level, erythrocyte indices, and red cell distribution width in students from different universities in Karachi, Pakistan. Their results showed that out of 500 obese students 36% was with low hemoglobin% levels [12]. According to our results, only 6.90% of students were anemic and 31.20% of students were having Polycythemia. This change might be due to the inclusion of more female participants in their research work.

Competing Interest

The authors declare that there is no conflict of interest.

Author Contributions

Zeeshan Haider, Sadia Abbas Khan, and Raima Rehman: Analyzed the questionnaire and compiled the results

Talha Abbas and Muhammad Tayyab Tariq: Performed sampling.

Inam ur Rehman and Muhammad Usman Ghani: Performed experimental work.

Ayza Yasin and Mahnoor Ahsan: Prepared the intial draft of manuscript.

Muhammad Umer Khan and Haleema Sadia: conceptualized and supervised the whole project and also finalized the manuscript.

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