# THE EFFECT OF STRESS ON EATING HABITS AND BODY COMPOSITION OF THE STUDENT POPULATION*

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*Original scientific paper*

## Abstract

Obesity is emerging as a serious problem worldwide. One of the factors contributing to obesity is stress. It appears to be particularly important, as it leads to poor diet, lack of physical activity, lack of sleep. The transition from high school to a university can increase perceived stress levels, which affect eating behavior and metabolism. This change alone leads to a difference in eating habits compared to the general population, which tends to rely on meals that are quick and easy to access.There are two main components of the stress response: the autonomic nervous system (ANS), which includes the sympathetic and parasympathetic nervous systems and the HPA axis. The goal of research was to assess the impact of stress on eating habits and body composition of the student population. The respondents were 50 students from the Faculty of Agriculture and Food Sciences UNSA. The devices used for body composition measurements are BIA-ACC and PPG Stress Flow (BioTekna S.r.l., Marcon-Venice, Italy). Statistical analyses included student's T-test to determine differences between the observed parameters regarding the gender. The biggest differences with respect to gender can be observed in the parameters of the HPA axis index ($p < 0,000$), which is one of the indicators of stress proving higher stress among women ($M = 3.8\pm0.4$ vs. $F= 2.4\pm0.7$) and between BMI in men and women ($p=0.2$). Men had a higher BMI than women ($M=24.4\pm3.2$ vs. $F=21.6\pm3.7$) but both were in the normal weight category.

Keywords: *students*, *stress, BIA-ACC, PPG Stress Flow, body composition.*

## INTRODUCTION

The beginning of university life represents an important transition period from adolescence to young adulthood, which can often be challenging due to the interaction between individual psychological characteristics and common stressors, such as academic demands, lifestyle changes, leaving home, separation from family, inadequate living conditions, physical and emotional issues, and financial concerns (Baumann *et al*., 2011).

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Weight gain is a common occurrence among students, especially those in their first year of the university (Choi, 2020). Obesity is recognized as a major global issue, impacting not just adults but also children, adolescents, and young individuals. Among the factors contributing to obesity, stress seems to play a particularly crucial role, as stressful situations result in unhealthy eating patterns, reduced physical activity, and dependencies, all of which are considered independent factors leading to obesity (Kumar *et al.*, 2007).

High levels of psychological stress have numerous detrimental effects on the academic, physical, and mental health of students (Chen *et al.*, 2020). Research has shown that psychological stress is a risk factor for overweight and obesity through various interactions between biological and behavioral mechanisms (Tomiyama, 2019). Meta-analysis of 14 longitudinal studies found that stressors, *including* general life stress (caregiver stress, major life events) and work-related stress, were positively associated with the risk of obesity with a moderate effect (Wardle *et al.*, 2011).

There are two main components of the stress response: the autonomic nervous system (ANS), which encompasses the sympathetic and parasympathetic nervous systems, and the HPA axis. These systems function centrally and peripherally to produce several responses. The 'fight or flight' response is an active reaction to either confront the stressor or flee from the confrontation. The 'defeat response' occurs when an individual engages in neither fight nor flight, ultimately 'losing' the confrontation; this is the primary stress response in modern society and is associated with changes in the HPA axis (Bose *et.al*., 2009).

The aim of this study is to assess the impact of stress on dietary habits and body composition in the student population.

## RESULTS AND DISCUSSION

Men represented 26% of the participants, while women accounted for 74%. On average, 38.3% of the respondents were in the second year of the first cycle of study, while 27.7% were in the third year. The minimum BMI was 16.4, indicating underweight, while the maximum BMI was 33.2, defined as obesity. The average BMI was 22.7±3.7 kg/m², which falls within the normal weight range. Most participants (65.96%) were within the normal weight range, while only 4.3% of respondents fell within the obesity range, which is a satisfactory result. In a study conducted on 50 students in Croatia, the average BMI was 22.1 ± 2.7 kg/m² (Keser *et al*., 2020) indicating a very small difference compared to the results of this study. The differences in BMI by gender were statistically significant ($p=0.23$, $p<0.05$). Men (24.4±3.1) had a higher BMI than women (21.6±3.6) who exhibited greater variations in their BMI values (Table 1).

Table 1. BMI results by the Year of Study

| BMI | I year (%) | II year (%) | III year (%) | MA (%) |
|---|---|---|---|---|
| <18.5 | 10 | 17 | 12 | 0 |
| 18.5-24.9 | 60 | 63 | 61 | 100 |
| 25-29.9 | 30 | 20 | 24 | 0 |
| ≥30.0 | 0 | 0 | 3 | 0 |

In a study conducted in 2007 at Auburn University (Gropper *et al*., 2012) a significant three-year weight gain of 2.1±4.7 kg and a BMI increase of 0.7±1.6 kg/m² were observed. Absolute gains in weight, BMI, percentage and absolute body fat were highest during the first year, followed by the third year, while the second year saw the lowest gains. Among 70% of students who gained weight over the three years, the average weight gain was 4.3 kg. The number of female participants with over 30% body fat doubled, while the number of male participants with over 20% body fat increased fivefold. Initially, 15% of students were classified as obese, while 79% had a normal weight; by the end of the second year, 24% were classified as obese, and 70% had a normal weight.

Comparing the results from other studies with those of this research, it can be concluded that students from Bosnia and Herzegovina have significantly better outcomes. The results for participants with normal body weight are quite similar, while there is a substantial difference in obesity classification results, which is not the case in the Auburn study. Additionally, variations in body weight during different years of study were noted in both studies.

Table 2. Dietary habits of the participants

| Frequency of food consumption | Yes (%) | No (%) |
|---|---|---|
| Vegetables | 72 | 28 |
| Fruits | 70 | 30 |
| Poultry | 56 | 44 |
| Red meat | 26 | 74 |
| Milk and dairy products | 45 | 55 |
| Grains and grain-based products | 85 | 15 |
| Coffee with sugar | 44 | 20 |
| Coffe without sugar | 16 | 20 |

Table 2 presents the dietary habits of respondents with a frequency of at least 4 times per week. The most of participants (72%) indicated that they consume vegetables at least 4 times a week. For fruits, a similar proportion (70%) reported the same. There were greater variations in the intake of poultry and red meat. Regarding red meat, 74% of respondents stated that they do not consume it 4 times a week, with some claiming that they never consume it, while 56% of participants reported eating poultry almost daily. The results show that 85% of respondents consume grains and grain-based products at least 4 times a week, whereas 15% expressed that they do not consume grains and grain-based products that frequently.

In a study conducted in 2019 with Korean students using a dietary habits questionnaire (Choi, 2020) it was recorded that 20.9% of respondents consume meat 5-6 times a week, while 39.7% consume meat 3-4 times a week. Milk and dairy products are consumed by 43.3% of respondents 1-2 times a week, while more than two pieces of fresh fruit are consumed by 40.7% of respondents 1-2 times a week. Grains and grain-based products are consumed 3-4 times a week by 43.0% of participants.

In a study conducted in 2019 in Romania, respondents with an average age of 21 were surveyed about their dietary habits using a questionnaire. The respondents reported consuming the following foods daily: 31% consumed meat and fruit, 28.5% reported consuming milk and dairy products, while less than half of the respondents (45.7%) consumed vegetables, and more than half of the respondents (52.61%) consumed grains and grain-based products every day (Pop *et al.*, 2021). By comparing the results from other studies with those of this research, it can be said that students from Bosnia and Herzegovina consume the highest amounts of fruits, vegetables, white meat, and grains (at least 4 times a week).

In a 2018 study involving Polish students with an average age of 22.7 years, bioimpedance was used to measure average fat tissue values, which were found to be 26.0 ±7.9% for women and 15.8±5.3% for men. A statistically significant difference was identified with respect to sex (Keska *et al*., 2018).

In a study conducted in 2016 in Italy, participants aged 18-21 with an adequate body mass index were measured using the BIA-ACC device via bioimpedance method. Men showed an average fat tissue percentage of 22.5 ± 4.8%, while women had an average of 25.3±4.4% (Stefanaki *et al*., 2016). By comparing these results from the two studies with the findings presented in Table 3, a difference in fat mass (FM) values among men can be observed, whereas no such difference was noted among female participants. Bosnian students in this study exhibited significantly higher average FM values compared to students from Poland and Italy.

Table 3. Results of body composition parameters categorized by gender

| SEX | M (%) | F (%) |
|---|---|---|
| BMR (kcal/day) | 1577.6 | 1358.5 |
| TBW | 49.6 | 45.0 |
| ICW | 60.1 | 53.0 |
| ECW | 39.8 | 46.9 |
| FFM | 70.8 | 74.6 |
| FM | 29.2 | 25.4 |
| ECMatrix | 21.4 | 29.6 |
| HPA INDEX | 3.8 | 2.5 |
| STM (kg) | 0.5 | 0.4 |
| Bm (kg) | 2.4 | 1.6 |
| ALST (kg) | 19.5 | 11.8 |
| AT (kg) | 29.4 | 20.5 |
| IMAT (kg) | 1.4 | 0.8 |

The HPA index greater than 3.5 is considered normal or circadian, indicating good cell health and an optimal level of stress hormones (cortisol). In addition to this reference value, there are two more categories: Flat low (low cortisol level throughout the day, with no fluctuations) and Flat high (high cortisol level throughout the day, with no fluctuations) are presented in Table 4.

Table 4. Norms for HPA axis index values

| Norms for HPA axis index values | HPA axis index values |
|---|---|
| Flat low | 1.0 – 2.6 |
| Flat high | 2.7 – 3.4 |
| Circadian | > 3.5 |

The average value for the HPA index is 2.8, which, according to Table 4, falls within the Flat high category. This means that, on average, the students in this study do not have good cell health, indicating that they have a system with poorly intact cell membranes and that cortisol levels are high throughout the day, without fluctuations.

Table 5. HPA axis index results categorized by three norms

| HPA axis index values | Average (%) |
|---|---|
| 1.0 – 2.6 (Flat low) | 42.5 |
| 2.7 – 3.4 (Flat high) | 36.2 |
| >3.5 (Circadian) | 21.3 |

It can be concluded from Table 5. that 42.5% of participants have a Flat low value of the HPA axis index, indicating that their cortisol levels are low, without fluctuations, and that cell health and cell membrane integrity are compromised. Only 21.3% of participants have HPA axis index values greater than 3.5, which represents the norm considered optimal, indicating excellent cell health and normal cortisol levels throughout the day.

Table 6. HPA axis index results categorized by gender

| HPA index osi | M (%) | F (%) |
|---|---|---|
| 1.0 – 2.6 | 0 | 55.6 |
| 2.7 – 3.4 | 27.2 | 38.8 |
| >3.5 | 72.8 | 5.6 |

It can be seen from the Table 6 that 72.8% of men had an HPA axis index value greater than 3.5, which is considered a satisfactory norm. In contrast, 55.6% of women had HPA axis index values ranging from 1 to 2.6, which falls into the flat low norm and is not satisfactory. Furthermore, only 5.6% of women had this value of 3.5, which is a very small number compared to men. Differences in HPA axis index by gender are statistically significant ($p=0.000$, $p<0.05$). Men (3.8±0.4) had a higher HPA axis index than women (2.4±0.7), with women showing greater variability in their HPA axis index values. Men exhibited more balanced cortisol secretion throughout the day, while women experienced greater fluctuations.

In a study conducted in 2016 in Italy, participants were measured with the BIA-ACC device using the bioimpedance method and they had a suitable body mass index. The average HPA axis index for men was 4.45±1.3, while for women, it was 6.02±2.26 (Stefanaki *et al*., 2016). Comparing the results of these two studies reveals a significant difference between them. Therefore, it can be concluded that Italian students have excellent cell health compared to Bosnian students, whose results indicate possible damage to cell membrane integrity and injury.

Table 7. HPA axis index results categorized by year of study

| HPA AXIS INDEX | I year (%) | II year (%) | III year (%) | MA (%) |
|---|---|---|---|---|
| 1.0 – 2.6 | 60 | 38 | 31 | 50 |
| 2.7 – 3.4 | 20 | 34 | 54 | 33.5 |
| >3.5 | 20 | 25 | 15 | 16.5 |

Table 7 shows the results for the HPA axis index categorized by year of study. It was observed that 60% of participants in their first year have a Flat low HPA axis index, while only 20% show a normal HPA axis index. In the following years, the results vary: the percentage of participants with a Flat low HPA axis index decreases to 38% in the second year and 31% in the third year, before rising again to 50% in the master's program. On the other hand, the Flat high HPA axis index increases during the first three

years of study but decreases by almost half during the master's program. The normal HPA axis index remains above 20% of participants during the first three years, while this percentage drops to 16.5% in the master's program. These results suggest that stress levels vary during the years of study and are not solely elevated in the first year.

Table 8. Spearman correlation results of body composition index (first part)

| | | BMI | TBW | ECW | ICW | FFM | FM | HPA INDEX OSI |
|---|---|---|---|---|---|---|---|---|
| BMI | Correlation Coefficient | 1.000 | -0.201 | **-0.777**$^{**}$ | **0.777**$^{**}$ | -0.923$^{**}$ | 0.924$^{**}$ | 0.417$^{**}$ |
| | Sig. (2-tailed) | . | 0.176 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| TBW | Correlation Coefficient | -0.201 | 1.000 | 0.027 | -0.027 | 0.465$^{**}$ | -0.464$^{**}$ | 0.475$^{**}$ |
| | Sig. (2-tailed) | 0.176 | . | 0.856 | 0.856 | 0.001 | 0.001 | 0.001 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| ECW | Correlation Coefficient | -0.777$^{**}$ | 0.027 | 1.000 | -1.000$^{**}$ | 0.774$^{**}$ | -0.776$^{**}$ | -0.642$^{**}$ |
| | Sig. (2-tailed) | 0.000 | 0.856 | . | . | 0.000 | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| ICW | Correlation Coefficient | 0.777$^{**}$ | -0.027 | -1.000$^{**}$ | 1.000 | -0.774$^{**}$ | 0.776$^{**}$ | 0.642$^{**}$ |
| | Sig. (2-tailed) | 0.000 | 0.856 | . | . | 0.000 | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| FFM | Correlation Coefficient | **-0.923**$^{**}$ | 0.465$^{**}$ | **0.774**$^{**}$ | **-0.774**$^{**}$ | 1.000 | -1.000$^{**}$ | -0.273 |
| | Sig. (2-tailed) | 0.000 | 0.001 | 0.000 | 0.000 | . | 0.000 | 0.063 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| FM | Correlation Coefficient | **0.924**$^{**}$ | -0.464$^{**}$ | -0.776$^{**}$ | 0.776$^{**}$ | -1.000$^{**}$ | 1.000 | 0.278 |
| | Sig. (2-tailed) | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | . | 0.058 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| HPA INDEX OSI | Correlation Coefficient | 0.417$^{**}$ | 0.475$^{**}$ | **-0.642**$^{**}$ | **0.642**$^{**}$ | -0.273 | 0.278 | 1.000 |
| | Sig. (2-tailed) | 0.004 | 0.001 | 0.000 | 0.000 | 0.063 | 0.058 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |

**The correlation is significant at the 0.01 level (2-tailed)

Table 9. Spearman correlation results of body composition index (second part)

| | | BMI | BMR (kcal/day) | STM (kg) | Bm (kg) | ALST (kg) | AT (kg) | IMAT (kg) |
|---|---|---|---|---|---|---|---|---|
| BMI | Correlation Coeffic. | 1.000 | 0.590** | 0.752** | 0.747** | 0.767** | **0.928**** | **0.907**** |
| | Sig. (2-tailed) | . | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| BMR (kcal/day) | Correlation Coeffic. | 0.590** | 1.000 | **0.926**** | **0.927**** | **0.921**** | 0.718** | 0.757** |
| | Sig. (2-tailed) | 0.000 | . | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| STM (kg) | Correlation Coeffic. | 0.752** | 0.926** | 1.000 | 0.998** | 0.995** | 0.766** | 0.808** |
| | Sig. (2-tailed) | 0.000 | 0.000 | . | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| Bm (kg) | Correlation Coeffic. | 0.747** | 0.927** | 0.998** | 1.000 | **0.993**** | 0.760** | 0.802** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | . | 0.000 | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| ALST (kg) | Correlation Coeffic. | 0.767** | 0.921** | 0.995** | 0.993** | 1.000 | 0.790** | 0.833** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | . | 0.000 | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| AT (kg) | Correlation Coeffic. | 0.928** | 0.718** | 0.766** | 0.760** | 0.790** | 1.000 | 0.985** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | . | 0.000 |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| IMAT(kg) | Correlation Coeffic. | 0.907** | 0.757** | 0.808** | 0.802** | 0.833** | 0.985** | 1.000 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | . |
| | N | 47 | 47 | 47 | 47 | 47 | 47 | 47 |

**The correlation is significant at the 0.01 level (2-tailed)

Detailed results of Spearman correlation of body composition index are divided in two tabels and the first part can be found in Table 8. The correlation coefficient between BMI and Fat Mass (FM) is 0.924. This value is very close to 1, indicating a very strong relationship between these two variables. The significance level is 0.000, which is less than 0.01, making the relationship highly significant. Therefore, there is a very strong and significant correlation. The positive correlation indicates that as the value of BMI increases, the value of FM also increases.

The correlation between BMI and Fat-Free Mass (FFM) is -0.923, suggesting a very strong and significant negative relationship; as BMI decreases, the value of FFM increases. The correlation between BMI and Extracellular Water (ECW) is 0.777, while the correlation between BMI and Intracellular Water (ICW) is -0.777. The correlations among these variables are strong and highly significant.

The difference lies in the signs of the correlations. The correlation between BMI and ICW is positive, meaning that as one value increases, so does the other. Conversely, the correlation between BMI and ECW is negative, indicating that as BMI decreases, the value of ECW increases. The correlation between the HPA axis index and BMI is 0.417. This correlation is moderate but not statistically significant ($p = 0.004$).

The correlation between the HPA axis index and ECW is -0.642, while the correlation between the HPA axis index and ICW is 0.642. Both correlations are strong and highly significant, as the significance level is less than 0.01. The key difference is in the sign of the correlation. The correlation between the HPA axis index and ECW is negative, suggesting that the variables move in opposite directions, while the correlation between the HPA axis index and ICW indicates that the variables move in the same direction. This reflects on cell health and membrane integrity, indicating whether the systems are compromised or not (Weir, 2016).

The other part of correlations is presented in the following Table 9. The correlation between BMI and AT is 0.928**, indicating a very strong and significant correlation. The sign is positive, meaning that the variables move in the same direction. As a person gains weight and their BMI increases, the level of AT in the body also rises and changes. The correlation between BMI and IMAT is 0.907**. This correlation is also very strong and significant.

One of the results of the PPG stress flow is a graph that shows the strength of the balance of the ANS (autonomic nervous system). The graph shows the strength of the SNS (Sympathetic Nervous System) and PNS (Parasympathetic Nervous System) strength and whether these strengths are in a state of homeostasis or in a state of allostasis (Vodopianov *et al*., 2022). An example of homeostasis can be normotonia of the autonomic nervous system (ANS) shown in Figure 1.

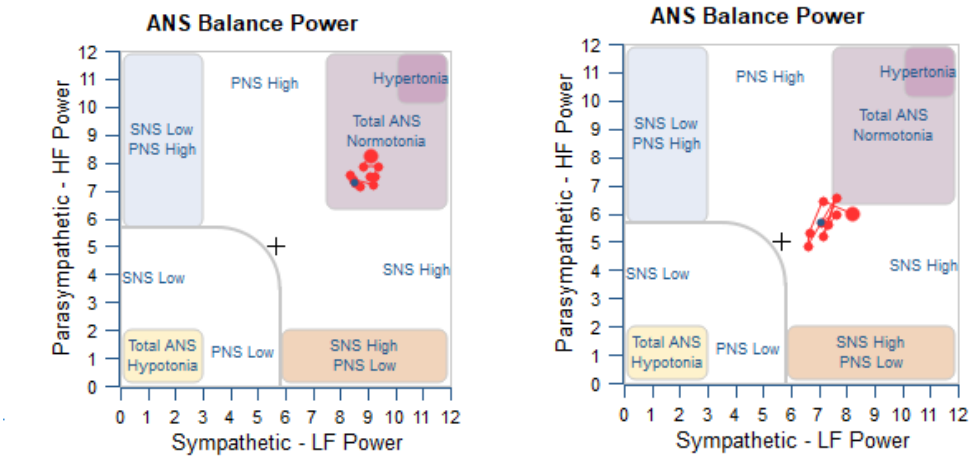


Figure 1. Homeostatic Balance of SNS and PNS Power (left) and allostatic Load of SNS and PNS Power (right) (BioTekna, 2021)

Table 10. Results of the balance of ANS strength categorized by gender

| ANS Balance Strength | M (%) | F (%) |
|---|---|---|
| Allostasis | 0 | 25 |
| Homeostasis | 100 | 75 |

It can be observed that 100% of male participants are in a state of homeostasis, while there is a division among women (Table 10), 25% of women are in a state of allostasis, where both PNS and SNS levels are high. The remaining 75% of women have achieved total ANS normotonia (homeostasis).

Table 11. Results of ANS balance strength divided by year of study

| ANS Balance Strength | I year (%) | II year (%) | III year (%) | MA (%) |
|---|---|---|---|---|
| Allostasis | 33.4 | 33.4 | 22.1 | 11.1 |
| Homeostasis | 18.5 | 39.5 | 29 | 13 |

The results of ANS balance (table 11) strength are presented according to the year of study, where the results for first and second-year students show that 33.4% of participants are in a state of allostasis. These results are significantly lower for the other years. However, during the second year, 39.5% of participants were in homeostasis, which represents excellent results. The lowest percentage of participants in a state of allostasis is found among master's students, at 11.1%.

## CONCLUSIONS

Based on the research results, it can be concluded that the majority of students adhere to the recommended daily intake of certain foods that are essential for daily consumption (fruits, vegetables, meat, milk and dairy products, grains and grain-based products, and fats).

There is a statistically significant difference between BMI in men and women ($p$=0.23). Men had a higher BMI (24.4±3.2) compared to women (21.6±3.7). Both results indicate that the participants have a normal nutritional status. The only reason men included in this study have a higher BMI is due to their larger physique.

The average percentage of body fat in women is 25.36%, while in men, it is 29.36%, which exceeds the normative range (min 7%, max 25%) set for men. Male participants still had a higher percentage of body fat compared to female participants, whose body fat percentage fell within optimal parameters.

The values of the HPA index, which is an indicator of chronic stress, differ significantly between male and female participants ($p < 0.000$). Men exhibit statistically significantly higher values compared to women ($M = 3.8 \pm 0.4$ vs. $F = 2.4 \pm 0.7$), indicating that male participants predominantly have a circadian rhythm of cortisol secretion compared to females.

According to the results concerning the balance of the autonomic nervous system (ANS), it can be concluded that male participants (100%) have better outcomes than female participants (75%). This means that all male participants are in a state of homeostasis, while changes in the strength of ANS balance are observed in female participants, with 25% of women experiencing allostasis. The results for homeostasis and allostasis vary significantly depending on the year of study.

BMI had a positive correlation with fat mass (FM), adipose tissue (AT), intramuscular adipose tissue (IMAT), and intracellular water (ICW), which means that as the BMI of the participants changes, so do the other parameters. Additionally, the HPA axis index has a positive correlation with ICW and a negative correlation with extracellular water (ECW), which indicates that a low HPA index suggests compromised cellular health, while a high HPA index indicates optimal cellular health.

The overall conclusion of this research is that female participants experience higher stress levels compared to their male colleagues.

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## UTICAJ STRESA NA PREHRAMBENE NAVIKE I TJELESNU KOMPOZICIJU STUDENTSKE POPULACIJE

### Sažetak

Gojaznost postaje ozbiljan problem širom svijeta. Jedan od faktora koji doprinosi gojaznosti jeste stres. Čini se da je ovaj faktor posebno važan, jer dovodi do nepravilne ishrane, nedostatka fizičke aktivnosti i nedostatka sna. Prijelaz iz srednje škole na fakultet može povećati nivo percipiranog stresa, što utiče na prehrambene navike i metabolizam. Ova promjena sama po sebi utiče na razlike u prehrambenim navikama u odnosu na opću populaciju - studenti se oslanjaju na obroke koji su lako dostupni i brzi za pripremu. Postoje dvije glavne komponente stresnog odgovora: autonomni nervni sistem (ANS), koji uključuje simpatički i parasimpatički nervni sistem, te HPA os.

Cilj istraživanja bio je procijeniti uticaj stresa na prehrambene navike i tjelesnu kompoziciju studentske populacije. U istraživanju se učestvovalo 50 studenata sa Poljoprivredno-prehrambenog fakulteta Univerziteta u Sarajevu. Uređaji korišteni za mjerenje tjelesne kompozicije su BIA-ACC i PPG Stress Flow (BioTekna S.r.l., Marcon-Venice, Italija). Studentov T-test korišten je da bi se utvrdilo postoji li statistički značajna razlika između parametara u odnosu na spol. Najveće razlike s obzirom na spol mogu se primijetiti u parametrima HPA indeksa ($p < 0,000$), koji je jedan od pokazatelja stresa, što dokazuje viši nivo stresa među ženama ($M = 3,8 \pm 0,4$ vs. $F = 2,4 \pm 0,7$) i između BMI kod muškaraca i žena ($p = 0,23$). Muškarci su imali viši BMI od žena ($M = 24,4 \pm 3,2$ vs. $F = 21,6 \pm 3,7$), ali oba spola spadaju u kategoriju normalne tjelesne mase.

Ključne riječi*: studenti*, *stres, BIA-ACC, PPG Stress Flow, tjelesna kompozicija*.