ISSN: 2717-8161 RESEARCH ARTICLE

New Trend Med Sci 2022; 3(1): 20-26. https://dergipark.org.tr/tr/pub/ntms

Comparison of Impulsivity and Eating Attitude According to Exercise Status

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Article History
Received 29 Now 2021
Accepted 02 Jan 2022
Published Online 15 Jan 2022

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Abstract: The aim of this study was to compare the impulsivity and eating attitudes of volleyball players and sedentary students, and determine the possible effects of regular exercise on these attitudes. A total of 65 participants, 32 volleyball players and 33 sedentary individuals voluntarily participated in this study. A Personal Information Form, Eating Attitudes Test (EAT-40), and Barratt Impulsiveness Scale were administered to the participants. Independent Samples t-test, Pearson Correlation test, and Multiple Regression analysis were used in the statistical analysis. No statistically significant differences were found between the total scores of the volleyball players and sedentary participants in terms of eating attitudes and impulsivity. However, significant differences were found in the sub-dimensions of non-planning and motor impulsivity ($p<0.05$). Moreover, a statistically significant positive correlation was found between the total scores of the Eating Attitudes Test and the total scores of the Barratt Impulsiveness Scale ($r=.378$, $p=.002$). Statistically significant positive correlation was found between the Eating Attitudes Test total scores and motor ($r=.448$, $p=.000$) and attentional impulsivity ($r=.263$, $p=.035$). A significant interaction was detected between the sub-dimensions of the Barratt Impulsiveness Scale (non-planning, motor and attention impulsivity), and the total scores of Eating Attitudes Test ($R=.455$, $R^2 = .207$, $p<0.01$). The t-test results regarding the significance of the regression coefficients showed that the motor impulsivity variable was an important predictor of eating attitude. This study demonstrated that regular exercise is a significant predictor of motor impulsivity on eating attitudes of regularly trained volleyball players as compared to sedentary participants.

Keywords: Volleyball; Athlete; Sedentary; Eating Attitude; Impulsivity.

1. Introduction

Exercise is a set of regular, planned and repetitive activities aimed at maintaining and improving cardiovascular endurance, hormonal balance, physical and mental fitness (1,2). Regular exercise has positive

Cite this article as: Ozturk D, Oral M and Ceyhun HA. Comparison of Impulsivity and Eating Attitude According to Exercise Status. *New Trend Med Sci* **2022**; 3(1): 20-26.

effects on physiological, metabolic and psychological health as well as beneficial effects on chronic diseases (3). Regular exercise is very important in both body weight and appetite control (4). It has been shown that exercise is also effective on the individual's self-esteem and stress management, and reduces depression level (5).

Impulsivity has been associated with many issues such as not making a plan, not taking risks in the face of events, and displaying reactive behaviors in the context of neurophysiological, psychological and behavioral characteristics that affect the individual's life (6). Impulsivity is defined as the inability to fully interpret the stimuli reaching the cerebral cortex and to generate the appropriate response, the responses result in a quick unplanned response, and the behavior becomes desensitized to the negative consequences of the given response (7). Impulsivity physiologically stimulates the urge to eat in individuals, causing uncontrolled eating behavior and enabling them to turn to foods (especially simple carbohydrates) that are more harmful than beneficial to the body. Individuals with impulsivity are more interested in appetizing, high-calorie foods because they cannot control their eating behavior (8,9). Eating behavior is associated with many complex regulations including social and emotional development, managed by the motor and sensory functions of the brain. Eating behavior is not only a behavior to meet the essential needs of the body, but also associated with pleasurable and painful patterns (10). Eating disorder is a condition that is related to body weight and appearance, but occurs with thought and eating behavior pathology (11). In this case, the individual's eating attitude and body image deteriorates (12). Several studies have indicated that regular exercise reduces body dissatisfaction (13), facilitates weight gain in anorexia nervosa (14), reverses cardiac abnormalities (15) and improves quality of life (16).

The current study evaluated the sub-dimensions of impulsiveness in volleyball players, and the relationship between impulsive consumption patterns and eating attitudes in athletes. Although exercise is an effective intervention for many psychological health problems, it has been overlooked as a potential aid in impulsivity and eating attitudes. Therefore, the aim of this study is to compare the impulsivity and eating attitude levels of volleyball players and sedentary students, and to determine the possible effects of regular exercise on these attitudes.

2. Material and Methods

The purpose of this study was to compare the impulsivity and eating attitude levels of volleyball players and sedentary students, and to determine the possible effects of regular exercise on these attitudes. The relational screening model, which is one of the general screening models, was used in the current study. This model is a screening method applied to the whole universe or a smaller group taken from the universe in order to have a general opinion about this universe from a universe with a large number of members (17). Also, relational screening model is a screening approach that detects common differentiation in two or more variables. Relational screening models aims at determining the presence and/or level of change between two or more variables and specifies the relationships between these variables. (18).

The study aimed at achieving the following sub-objectives:

- What are the eating attitude levels of the participants?
- What are the impulsivity levels of the participants?
- Is there a relationship between the eating attitudes of the participants and their impulsivity levels?
- What is the effect of impulsivity on eating attitude?

2.1. The hypotheses of the research

- H0= There is no relationship between the eating attitude of the participants and their level of impulsivity.
- H1= There is a strong relationship between the eating attitude of the participants and their level of impulsivity.

2.2. The universe and sample of the research

The universe of this research consisted of volleyball players (n:32) who study at different programs of a University and completed 60 minutes of volleyball training, and 20 minutes of strength training at least 3 days a week and sedentary students (n:33) who did not exercise regularly. The number of volleyball players and sedentary students and their descriptive data are shown in Table 1. The Barratt Impulsiveness Scale and Eating Attitudes Testcale were administered to the participants within the scope of the research, and the data were collected. Research and Publication Ethics have been complied. Permission was obtained from the University Sports Sciences Faculty Ethics Committee (Date: 17.03.2021, Number: 70400699-050.02.04-E.2100083816). In addition, individuals who agreed to participate in the study were asked to read and sign the Informed Consent Form, and the study was carried out in accordance with the Principles of the Declaration of Helsinki.

2.3. Data collection tools

The Personal Information Form, Barratt Impulsiveness Scale and the 'Eating Attitudes Test (YTT-40), which have reliability and validity were administered to the potential clients.

2.4. Personal Information Form

The personal information form designed by the researchers consisted of questions including gender, age, height, weight, body mass index, and exercise status of the participants.

2.5. Barratt Impulsiveness Scale

The Barratt Impulsiveness Scale was developed by Patton, Stanford, and Barrat (1995) to evaluate the personality/behavioral structure of impulsivity and measures motor, behavioral, cognitive, and thought impulsivity. The scale contains 30 items, and has three sub-dimensions-attentional, motor and non-planning. Four types of scores are achived in the scale, including the total score and the total scores of each sub-dimension (attentional, motor and non-planning). The Turkish validity and reliability study of this scale was conducted by Gulec et al. (2008), and the internal consistency coefficient of the scale was found to be 0.78 for students, and 0.81 for patients. The current study revealed that the internal consistency of the scale was tested using Cronbach's alpha (Cronbach α 0.77).

2.6. Eating Attitudes Scale (EAT-40)

EAT-40 is a scale developed with the aim of evaluating possible disorders in eating behavior and identifying problematic eating behaviors. The scale was developed by Garner and Garfinkel in 1979, and the validity and reliability of the Turkish version of the scale was established by Savasir and Erol (1989) (19). EAT-40 is a self-report format questionnaire with 40 items and each item is rated on a 6-point Likert Scale. A score of 30 and greater on this scale indicates greater disordered eating attitudes. Previous studies reported that individuals with a score above 30 except 7% of participants exhibited eating behavior disorder (20, 21). The total score is directly related to the level of psychopathology. EAT-40, in addition to detecting people who can be clinically determined as "patients", can also show the susceptibility to the risk of developing psychopathology. The internal consistency coefficient of the scale was found to be 0.70 in Turkish adaptation study conducted by Savasir and Erol (1989) (20). For the current study, the internal consistency of the scale was tested using Cronbach's alpha (Cronbach α 0.75).

2.7. Statistical Analysis

SPSS 20.0 package program was used in the analysis of the data. The normality of the data was evaluated with the Kolmogorov-Smirnov Test. According to this test result, all data showed normal distribution. Independent Sample t-test was used to compare the eating attitudes and impulsivity levels of volleyball players and sedentary participants. The relationship between the eating attitude of the participants and their level of impulsivity was analyzed with Pearson Correlation Test. Additionally, Multiple Regression Analysis was performed to show the level of impulsivity predicting eating attitude. Data obtained from the scales were reported as mean and standard deviation, and data obtained from demographic characteristics were reported as frequency distribution. The level of $p<0.05$ was accepted as statistically significant.

3. Results

The demographic characteristics of the participants, the scales scores, and the findings related to the research questions were included in this section.

3.1 The Demographic Characteristics of Participants

64.6% of the 65 students constituting the sample group of the study were female (n=42), while 35.4% were male (n=23). On the other hand, 32 of 65 students were volleyball players who exercised regularly, whereas 33 of them were sedentary participants who did not exercise regularly. The mean age, height, and body weight of the students were found to be 19.63±.99 years, 168.95±9.04 cm, and 62.27±11.93 kg, respectively (Table 1).

Table 1: The Descriptive Statistics of Volleyball Players and Sedentary Participants.

Descriptive Data	Volleyball players n (%)	Sedentary n (%)	Total (%)
Gender			
Female	16 (50)	26 (78.8)	42 (64.6)
Male	16 (50)	7 (21.2)	23 (35.4)
Age			
18-19	12 (37.5)	19 (57.6)	31 (47.7)
20-22	20 (62.5)	14 (42.4)	34 (52.3)
Body Mass Index			
Underweight (18.5 kg/m²)	2 (6.9)	3 (10.0)	5 (8.5)
Normal (18.5-25 kg/m²)	22 (75.9)	23 (76.7)	45 (76.3)
Overweight (25-30 kg/m²)	5 (17.2)	4 (13.3)	9 (15.3)

Table 2: Comparison of Eating Attitude Levels according to Exercise Status.

	Groups	N	Mean	S.D.	t	p
Eating Attitude Total Score	Volleyball players	32	18.97	10.83	.792	.431
	Sedentary	33	17.21	6.61		

As shown in Table 2, it was observed that there was no statistically significant difference in the comparison of the eating attitude levels of the volleyball players and sedentary participants (p>0.05).

Table 3: Comparison of Impulsivity Levels according to Exercise Status.

	Groups	N	Mean	S.D.	t	p
Total Score	Volleyball players	32	61.22	7.34	.661	.511
	Sedentary	33	60.00	7.51		
Non-planning impulsivity	Volleyball players	32	22.56	2.86	-2.905	.040*
	Sedentary	33	24.42	4.16		
Motor impulsivity	Volleyball players	32	21.06	3.99	2626	.011*
	Sedentary	33	18.70	3.23		
Attentional impulsivity	Volleyball players	32	17.28	3.44	.500	.619
	Sedentary	33	16.88	3.03		

* p< .005.

As shown in Table 3, significant differences were found in the sub-dimensions of non-planning impulsivity and motor impulsivity between volleyball players and sedentary participants (p<0.05). There was no statistically significant difference in the total score and attentional impulsivity sub-dimension (p>0.05).

Table 4: The Relationship between Eating Attitudes and Impulsivity Levels.

			Total score	Non-planning	Motor	Attentional	Eating Attitude Total score
Barratt Impulsivity Scale	Total score	r	1				
		p	.				
	Non-planning	r	.594**	1			
		p	.000	.			
	Motor	r	.763**	.181	1		
		p	.000	.149	.		
	Attentional	r	.743**	.122	.456**	1	
		p	.000	.334	.000	.	
Eating Attitude Scale	Total score	r	.378**	.040	.448**	.263*	1
		p	.002	.753	.000	.035	.

*p< 0.05, **p< 0.01, *** p< 0.001.

According to Table 4, a statistically significant positive correlation was found between the total score of the eating attitude scale and the total score of the impulsivity scale (r=.378, p=.002). These results indicated that as impulsivity level increased, so did the eating attitude levels of the participants. Moreover, a statistically significant positive correlation was found between the Eating Attitude Test total score and motor (r=.448, p=.000), and attentional impulsivity (r=.263, p=.035).

Table 5: Multiple Regression Predicting Eating Attitudes.

Variables	**B**	**SE B**	**B**	**T**	**p**
(Constant)	-2.570	8.394		-.306	.760
Non-planning impulsivity	-.111	.282	-.046	-.395	.694
Motor impulsivity	.992	.304	.422	3.260	.002
Attentional impulsivity	.209	.354	.076	.589	.558
R = .455	R^2 = .207				
$F_{(3,61)}$ = 5313	p = .003				

Table 5 shows that there was a significant interaction between the sub-dimensions of the Barratt Impulsiveness Scale (non-planning, motor and attention impulsivity), and the total score of Eating Attitudes Test ($R=.455$, $R^2 = .207$, $p<.01$). These three variables jointly explain approximately 21% of the variance in eating attitudes. According to the standardized regression coefficient (β), the relative ranking of the predictor variables to the eating attitude was found to be motor, attentional and non-planning impulsivity. When the significance of the regression coefficients was analyzed in terms of the t-test results, it was found that the motor impulsivity variable played an important role as a predictor of the eating attitude. The study results demonstrated that the variables of non-planning and attentional impulsivity did not have a significant predictor.

4. Discussion

The aim of this study was to compare the impulsivity and eating attitudes of volleyball players and sedentary students, and to determine the possible effects of regular exercise on these attitudes. The present study showed that volleyball players and sedentary participants had similar levels in terms of total eating attitudes, total impulsivity, and attention impulsivity. It is a well-known fact that exercise affects our nervous system and especially our hormones, which play a role in our emotions and psychology (22). One of the hormones that increase production when exercising and making a person feel happier and more energetic is endorphins. (23). The present study also demonstrated that non-planning impulsiveness was higher in sedentary participants than volleyball players, and motor impulsivity scores were higher in volleyball players than sedentary participants.

Unplanned impulsivity indicates that sedentary students do not like to engage in tasks involving mental complexity and cognitive participation in planning their lives, they are focused on the moment they live in, and their instability in making plans by acting without thinking about the future. Similar to our study, it is stated that exercise positively affects behaviors and cognitive functions such as impulse control and decision-making functions, as well as reducing unplanned impulsivity (24).

On the other hand, the fact that the motor impulsivity scores of volleyball players were higher than those of sedentary participants indicates that the tendency of volleyball students to act without thinking is higher than sedentary students.

Previous studies showed that higher rates of motor impulsivity were reported in male university students compared to females in our country (25, 26). The higher number of male participants in the volleyball players group compared to the sedentary participants group may have been effective in this result. Furthermore, although body mass index and eating attitudes did not differ between the volleyball players group and the sedentary participants group, significant impulsivity differences were found. In contrast to our results, recent studies stated that high rates of overweight and obesity among university students were also reported to be associated with physical inactivity (27). Adding regular exercises to daily routines is defined as a health-promoting lifestyle (27). As obesity rates increase worldwide, there is a need for methods to adopt the lifestyle behaviors necessary for sustainable weight loss (28).

The results of this study have also shown that there was a positive and significant relationship between impulsivity and disorder in eating attitudes. The association of impulsive personality traits with impaired eating behaviors, binge eating disorders, and increased body mass index has attracted attention. Similar to our results, previous research have also demonstrated that high levels of impulsivity were observed in university students with impaired eating behaviors. (29, 30).

The present study also revealed that motor impulsivity was an important predictor of eating attitude. Motor impulsivity is characterized by a lack of behavioral control and acting quickly without adequate consideration of consequences. In one study, impulsive traits were shown to be indirectly related to obesity, and high-risk behaviors that cause an increase in addictive food consumption (30). Recent systematic reviews and meta-analyses have identified impulsive traits as a potential etiological and/or maintenance factor for binge eating behavior (31).

It was recommended that regular exercise, which was among the behavioral interventions that were effective in treating impulsivity, also associated with many psychopathologies, should be included in the improvement of psychosocial well-being (32). Also, increasing physical activity with regular exercise could help compensate and suppress the hedonic urge to overeat (33, 34). Considering that regulating behavior is based on the effectiveness of sufficiently suppressing impulsive responses to external stimuli, it seems surprising that motor impulsivity kept being a problem for the volleyball players group that regularly exercised. Motor impulsivity, which can be reflected as the tendency to be quick in reacting to the arrival of the ball in volleyball players in our study group, can also be reflected as agility in sports when combined with foresight, the cognitive component in which planning and position are well predicted (35). Motor impulsivity can be associated with the performance required for agility by providing rapid body movement with a change in speed or direction in response to a stimulus. On the other hand, if it is not balanced with the cognitive component, it can also be associated with the risk of injury by causing reckless behavior (36).

5. Conclusions

The present results support that impulsivity can be considered as a risk factor for individuals to develop eating psychopathology. There are some limitations in our study. The cross-sectional nature of the study is not sufficient to establish a cause-effect relationship. Our sample is relatively small and its average BMI is classified as normal. It may be useful to perform similar studies in larger groups of overweight or obese individuals and in more gender-balanced samples. Despite these limitations, to our knowledge this was the first study to evaluate the sub-dimensions of impulsiveness in volleyball players, and the relationship between impulsive consumption patterns and eating attitudes. Lastly, the present study revealed valuable findings that will encourage behavior change among those with a sedentary lifestyle.

Limitations of the Study

There are some limitations in our study. The cross-sectional nature of the study is not sufficient to establish a cause-effect relationship. Our sample is relatively small and its average BMI is classified as normal. It may be useful to perform similar studies in larger groups of overweight or obese individuals and in more gender-balanced samples.

Acknowledgement

None

Conflict of Interests

The authors approved that they have no conflict of interest

Financial Support

The authors approved that this study has received no financial support from any institution.

Author Contributions

Ozturk, D., Ceyhun Akgül, H. contributed to the constructing the idea for research. Ozturk, D., Ceyhun Akgül, H. and Oral M. contributed to the planning the design of the work. Data Collection and/or Processing- Ozturk D., Oral, M. Analysis and/or Interpretation – Oral M.; Literature Review Ozturk, D., Ceyhun Akgül, H. and Oral, M.; Writing Manuscript- Ozturk D.; Critical Review- Ozturk, D., Oral, M. and Ceyhun Akgül, H.

Ethical Approval

The study was approved by Atatürk University Sports Science Faculty Ethics Committee with the decision dated 17.03.2021 and numbered 70400699-050.02.04-E.2100083816.

Data sharing statement

None

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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