Section: Miscellaneous

Original Research Article

ASSESSMENT OF AUTONOMIC, COGNITIVE, PSYCHOLOGICAL PARAMETERS IN UNDERWEIGHT YOUNG ADULTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: There is a decline in parasympathetic activity and increased sympathetic activity followed by weight loss. The studies on the underweight category were relatively less. Hence, the present study was undertaken. **Aim and objectives:** The present study was undertaken to observe the autonomic, cognitive, and psychological parameters and quality of life in underweight young adults.
Materials and Methods: The present study was a cross-sectional study that included a total of 60 underweight young adults. Sixty age and gender matched healthy young adults were recruited as controls. Systolic and diastolic blood pressure were recorded from the dominant hand of the participants. Cognitive parameters were assessed using spatial and verbal memory scores. A spatial and verbal memory test is a standard test to assess memory. Different slides were used before and after the intervention. Psychological parameters were assessed using the perceived stress scale.
Results: There was a significant decrease in the systolic blood pressure in the under weight young adults. Significantly higher levels of stress were observed in the underweight young adults. No significant change was observed in the cognitive parameters between the underweight young adults and healthy young adults.
Conclusion: The study results support that there was a significant decrease in blood pressure and a significant increase in the stress levels in the underweight young adults when compared to the healthy young adults. Cognitive parameters were not significantly different between the underweight and healthy young adults.
Keywords: Underweight young adults, Body mass, Memory, Stress, Anxiety.

INTRODUCTION

It is well reported that increased body weight adversely affects the autonomic functions. Altered autonomic functions were reported in obese individuals, which leads to many cardiovascular disorders. At the same time, loss of body weight is also associated with autonomic dysfunction. There is a decline in parasympathetic activity and increased sympathetic activity followed by weight loss.[1] All heart rate variability parameters were lower in the case of the underweight individuals.[2] The studies are limited that studied the relationship between body mass and the obesity.[3,4] It was reported that nutritional deficiency, hormonal disorders may be the reason for autonomic dysfunction in underweight individuals.[5,6] Weight was reported to improve the physical activity and, thereby, improve the cognitive functions. In fact, weight reduction in patients with cognitive disorders helped to improve the same.[7-9] Another study reported that there was no cognitive decline based on age and weight status.[10] A Relationship exists between stress and weight changes. Both weight

gain and weight loss have been observed, followed by the stressful conditions.[11] Declined quality of life, especially the mental component decline, was observed in the underweight individuals. The studies on under weight category were relatively less. Hence, the present study was undertaken.

Aim and objectives: The present study was undertaken to observe the autonomic, cognitive, and psychological parameters and quality of life in underweight young adults.

MATERIALS AND METHODS

The present study was a cross-sectional study that included a total of 60 underweight young adults. The protocol was approved by the institutional human ethics committee. Willing males and females who were underweight were part of the study after obtaining voluntary, written, informed consent. Those who are following any therapies or diet patterns specific to managing underweight and with any severe complications were excluded from the study. After recruitment, the participants underwent a general physical examination. Sixty age and gender matched healthy young adults were recruited as controls after obtaining voluntary, written, informed consent. Autonomic functions were assessed using a diamond bpmr120 mercurial deluxe bp monitor. Systolic and diastolic blood pressure were recorded from the dominant hand of the participants. Cognitive parameters were assessed using spatial and verbal memory scores. A spatial and verbal memory test is a standard test to assess memory. Different slides were used before and after the intervention. Psychological parameters were assessed using the perceived stress scale.

Statistical Analysis: Data was analysed using SPSS 22.0 version. Student t-test was used to observe the significance of the difference between the groups. A probability value of less than 0.05 was considered significant

RESULTS

Table 1 presents the demographic data of the participants. Table 2 presents the Psychological, autonomic, and cognitive parameters among the underweight and healthy young adults. There was a significant increase in the stress scores in the underweight young adults when compared to the healthy. Significant lower systolic blood pressure was recorded in the under weight young adults. Diastolic pressure was not significantly different among the underweight and healthy. Cognitive functions were also not significantly different among the underweight and healthy.

Table 1: Demographic data of the participants

Parameter	Underweight (n=60)	Healthy (n=60)	P value
Age (years)	19.50±1.27	19.55±1.57	0.9430
BMI (kg/m2)	17.02±1.003	21.927±1.549	0.0001***

Data was presented as mean and SD. ***P<0.01 is significant

Table 2: Psychological, autonomic, and cognitive parameters among the underweight and healthy young adults

Parameters	Underweight (n=60)	Healthy (n=60)	P value
Perceived stress score	27.75±5.29	11.91±3.56	0.0001***
SBP (mmHg)	94.20±6.14	111.33±5.20	0.0001***
DBP (mmHg)	73.0±5.66	71.0±6.50	0.5223
Spatial memory	5.4±1.26	6±0.94	0.2447
Verbal memory	4.91±0.54	5±0.82	0.7645

Data was presented as mean and SD. ***P<0.01 is significant

DISCUSSION

The present study was undertaken to observe the autonomic, cognitive, and psychological parameters and quality of life in underweight young adults. There was a significant increase in the stress scores in the underweight young adults when compared to the healthy. Significant lower systolic blood pressure was recorded in the underweight young adults. Diastolic pressure was not significantly different among the underweight and healthy. Cognitive functions were also not significantly different among the underweight and healthy. There is a relation between the stress and body weight.[12] Earlier study reported that the stress has a positive impact on body weight that means increases body weight.[13] Another study reported that excess of depression, anxiety and stress in the underweight individuals when compared with the healthy individuals.[14] Increased body mass index is associated with the hypertension. Low BMI is associated with the hypotension as the parasympathetic activity increases in the underweight individuals.[15] Change in the autonomic activity was reported with a change in the body mass index.[16] Decrease in the adiposity was reported to reduce the working memory. Further, the executive functions also impaired in the underweight individuals.[17] Hence, underweight has to be addressed equally important like the overweight and obesity. The study results support that there was a significant decrease in blood pressure and a significant increase in the stress levels in the underweight young adults when compared to the healthy young adults. Cognitive

parameters were not significantly different between the underweight and healthy young adults.

CONCLUSION

The study results support that there was a significant decrease in blood pressure and a significant increase in the stress levels in the underweight young adults when compared to the healthy young adults. Cognitive parameters were not significantly different between the underweight and healthy young adults.

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REFERENCES

1. Costa, João et al. Effects of weight changes in the autonomic nervous system: A systematic review and meta-analysis. Clinical Nutrition. 2019; 38(1):110 - 126
2. Pushpa Krishna*, Deepa Rao And Vishal V. Navekar. Cardiac autonomic activity in overweight and underweight young adults. Indian J Physiol Pharmacol 2013; 57(2) : 146–152.
3. Vaz M, Sucharita S, Bharathi A V, Nazerath D. Heart rate variability and baroreflex sensitivity are reduced in chronically undernourished, but otherwise healthy, human subjects. Clinical Science 2003; 104: 295–302.
4. Sztajzel J, Golay A, Makoundou V, Lehmann TN, et al. Impact of body fat mass extent on cardiac autonomic alterations in women. Eur J Clin Invest 2009; 39: 649–656.
5. Baccarelli A, Cassano PA, Litonjua A, et al. Cardiac autonomic dysfunction: effects from particulate air pollution and protection by dietary methyl nutrients and metabolic polymorphisms. Circulation 2008; 117: 1802–1809.
6. Karthik S, Pal GK, Nanda N, Hamide A, Bobby Z, D Amudharaj, Pal P. Sympathovagal imbalance in thyroid dysfunctions in females: correlation with thyroid profile, heart rate and blood pressure. Indian J Physiol Pharmacol 2009; 53: 243–252.
7. Colcombe SJ, Erickson KI, Scalf PE, Kim JS, Prakash R, McAuley E, Elavsky S, Marquez DX, Hu L, Kramer AF. Aerobic exercise training increases brain volume in aging humans. J. Gerontol. Series A Biol. Sci. Med. Sci. 2006;61, 1166–1170.
8. Erickson KI, Raji CA, Lopez OL, Becker JT, Rosano C, Newman AB, Gach HM, Thompson PM, Ho AJ, Kuller LH. Physical activity predicts gray matter volume in late adulthood: the cardiovascular health study. Neurology. 2010;75, 1415–1422.
9. Siervo M, Arnold R, Wells JCK, Tagliabue A, Colantuoni A, Albanese E, Brayne C, Stephan BCM. Intentional weight loss in overweight and obese individuals and cognitive function: a systematic review and meta-analysis. Obes. Rev. 2011;12, 968–983.
10. Lynch DH, Howard AG, Tien HC, Du S, Zhang B, Wang H, Gordon-Larsen P, Batsis JA. Association Between Weight Status and Rate of Cognitive Decline: China Health and Nutrition Survey 1997-2018. J Gerontol A Biol Sci Med Sci. 2023 Jun 1;78(6):958-965.
11. Heshmati HM, Luzi L, Greenway FL, Rebello CJ. Editorial: Stress-induced weight changes. Front Endocrinol (Lausanne). 2023 May 22;14:1209975.
12. van der Valk ES, Savas M, van Rossum EFC. Stress and Obesity: Are There More Susceptible Individuals? Curr Obes Rep. 2018 Jun;7(2):193-203.
13. Harding JL, Backholer K, Williams ED, Peeters A, Cameron AJ, Hare MJ, Shaw JE, Magliano DJ. Psychosocial stress is positively associated with body mass index gain over 5 years: evidence from the longitudinal AusDiab study. Obesity (Silver Spring). 2014 Jan;22(1):277-86.
14. Hamurcu P. Impact of Perceived Body Weight on Depression, Anxiety and Stress Levels of Young Adults in Turkey. Iran J Public Health. 2023 Mar;52(3):603-611.
15. Drøyvold WB, Midthjell K, Nilsen TI, Holmen J. Change in body mass index and its impact on blood pressure: a prospective population study. Int J Obes (Lond). 2005 Jun;29(6):650-5.
16. Pal A, De S, Sengupta P, Maity P, Dhara PC. Relationship of body compositional and nutritional parameters with blood pressure in adults. J Hum Nutr Diet. 2014 Oct;27(5):489-500.
17. Narimani M, Esmaeilzadeh S, Azevedo LB, Moradi A, Heidari B, Kashfi-Moghadam M. Association Between Weight Status and Executive Function in Young Adults. Medicina (Kaunas). 2019 Jul 10;55(7):363.