

Heart rate variability parameters are decreased in obese adults

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Objectives: To evaluate an association between body mass index (BMI) and the cardiac autonomic activity by measuring heart rate variability (HRV), in obese and non-obese adults.

Patients and Methods: Cross-sectional data of 116 participants (54.3% females, age: 54.27±15.58 years, BMI: 28.25±5.53 kg/m²) were included in analysis. HRV data were analyzed in time and frequency domains using customized program CARDICODE 300 (type:HT312), obtained from 24 hours, day and night-time segments of Holter monitoring. Analysed HRV indices were: total power (TP), low-frequency power (LF), high-frequency power (HF), square root of the mean squared differences of successive normal

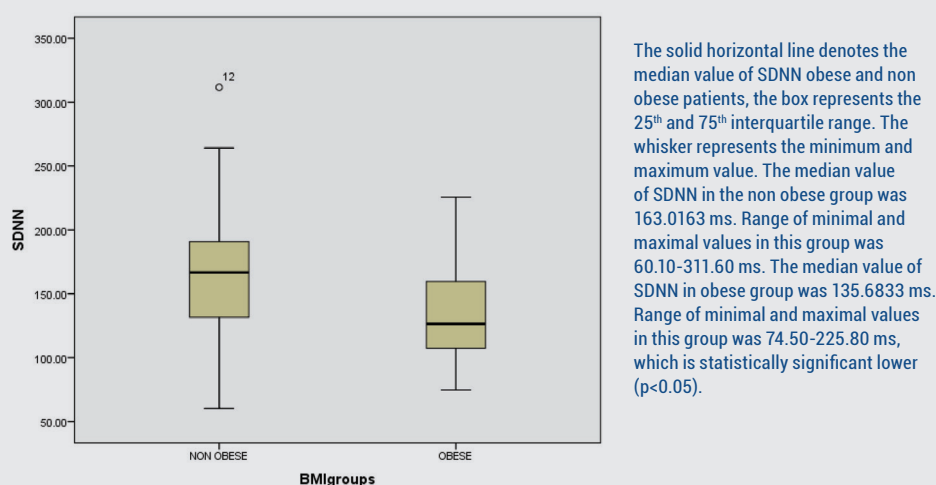


FIGURE 1. The values of SDNN (standard deviation of normal to normal RR interval) in obese and non-obese group.

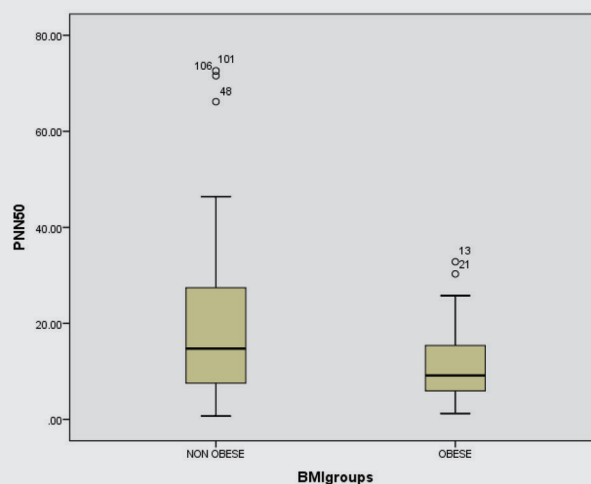
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to normal intervals (rMSSD), standard deviation of normal to normal RR interval (SDNN) and the proportion derived by dividing number of interval differences of successive NN intervals greater than 50 ms by the total number of NN intervals (pNN50). BMI was obtained according to common calculation using anthropometric measurements (weight, height) (kg/m²). Participants were grouped according to BMI into non obese (BMI<30 kg/m², n= 80) and obese (BMI ≥30 kg/m², n=36).

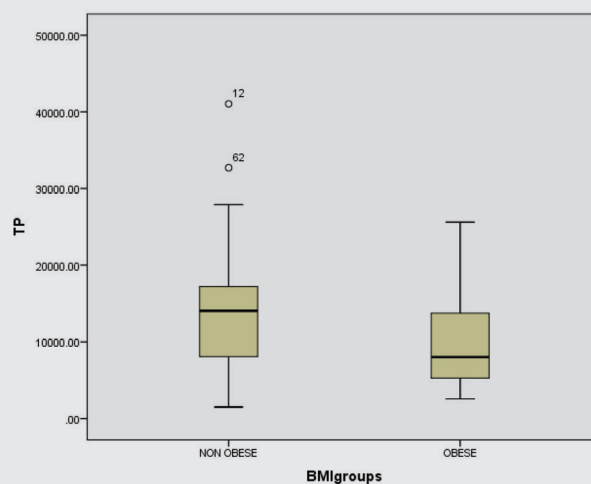
Results: Mean values of all analyzed HRV parameters (SDNN, rMSSD, PNN50, TP, LF and HF) were lower in obese compared to non-obese participants (Figures 1, 2, and 3). Statistically significant differences were found for SDNN, TP (p=0.002, p=0.01 respectively, using parametric independent samples t-test), and for pNN50 (p=0.036, using nonparametric Mann-Whitney U test).

Conclusion: These results support previous findings^{1,2} that HRV parameters are decreased in obese adults suggesting reduced both sympathetic and vagal autonomic regulation of heart.



The solid horizontal line denotes the median value of PNN50 obese and non obese patients, the box represents the 25th and 75th interquartile range. The whisker represents the minimum and maximum value. The median value of PNN50 in the non obese group was 18.7600 %. Range of minimal and maximal values in this group was 0.70-72.60 %. The median value of PNN50 in obese group was 11.6972%. Range of minimal and maximal values in group was 1.20-32.80%, which is statistically significant lower ($p<0.05$).

FIGURE 2. The values of PNN50 (the proportion derived by dividing number of interval differences of successive NN intervals greater than 50 ms by the total number of NN intervals) in obese and non-obese group.



The solid horizontal line denotes the median value of TP obese and non obese patients, the box represents the 25th and 75th interquartile range. The whisker represents the minimum and maximum value. The median value of TP in the non obese group was 13539.3000 ms*ms. Range of minimal and maximal values in this group was 1481.10-41059.90 ms*ms. The median value of TP in obese group was 10083.0500 ms*ms. Range of minimal and maximal values in group was 2566.00-25625.60 ms*ms, which is statistically significant lower ($p<0.05$).

FIGURE 3. The values of total power (TP) in obese and non-obese group.

LITERATURE

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