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Postural stability during quiet standing in obese and non-obese adults with type 2 diabetes mellitus

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1. Introduction

Diabetes which is a major health problem is related to impaired postural control due to peripheral neuropathy [1]. Obesity, another common health problem, is also found to be inseparably connected with postural instability. In particular, excessive body weight is demonstrated to significantly influence postural stability by altering center of mass position in the body. Impaired postural stability in T2DM and obesity has been documented separately by recent evidence [2,3]. We hypothesized that obesity would worsen the postural stability especially in adults who were diagnosed with T2DM. Therefore, the purpose of the current study was to investigate the possible impact of obesity on postural stability during quite standing in both obese and non-obese adults with T2DM.

2. Research question

How does obesity influence the postural stability in adults with T2DM by means of sway velocity of center of mass during quite standing?

3. Methods

The study was conducted at Fatih Sultan Mehmet Hospital Diabetes and Obesity Center in Istanbul, Turkey. Sixty-five adults (obese 37 adults with BMI $\geq$ 30 kg/m^2, non-obese 27 adults with BMI $<$ 30 kg/m^2) who had no any musculoskeletal and neurological disorder were recruited. Modified Clinical Test of Sensory Interaction in Balance test among Balance Master System (NeuroCom, USA) was used to evaluate the postural stability. The sway velocity (degrees/second) of center of mass was measured on firm surface on firm and foam surface with eyes open (EO) and eyes closed (EC) conditions by the system. We created binary outcome according to normative scores. We performed logistic regression to estimate which groups has greater risk.

4. Results

Number of people who had under normative scores in obese adults with diabetes; 14 (37,8%) in EO and 10 (27,0%) in EC on firm surface; 17 (45,9%) in EO and 34 (91,9%) in EC on foam surfaces; 26 (%70,3) in composite score. For non-obese adults with diabetes; 2 (7,4%) in EO and 8 (29,6%) in EC on firm surface; 9 (33,3%) in EO and 22 (81,5%) in EC on foam surfaces; 17 (%63,0) in composite score were determined. Obesity was higher risk eyes open scores in firm surface EO (OR:1.49 CI:1.13-1.96) but not in firm surface EC (OR:0.96 CI:0.70-1.32), firm surface with EO (OR:1.23 CI:0.82-1.84), firm surface with EC (OR:2.28 CI:0.60-8.75), composite score (OR: 1.26 CI:0.62-2.50).

5. Discussion

Findings of current study revealed that obesity in T2DM is an important concern for deteriorating postural stability during quite standing. Interestingly standing with more demanding conditions as foam surface and/or eyes closed did not disturb postural sway of remarkable distinct percentages.

It is noteworthy to pronounce that maintaining normal body weight in T2DM would encourage better postural stability in quite standing. An understanding of the obesity and its effect on postural stability in T2DM would provide another aspect for future intervention approaches for this population.

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