

The effects of a combined exercise programme on blood glucose, incretin hormone and leptin in type 2 diabetes

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Abstract

An excessive number of calories consumed daily, in addition to a sedentary lifestyle, are the main causes of increasing type 2 diabetes (T2D) prevalence worldwide (LEE, H.K. et al., 2010). Diabetes is usually accompanied by hypertension, lipid disorders and obesity. The aim of this study to show that combination exercise is effective. It will compare T2D and non-diabetes (ND) volunteers doing combination exercise consisting of resistance and cycling. The interventions are minor and fairly short consisting of 12 episodes of exercise over 6 weeks, yet this was enough to produce measurable change and improvement. This included the re-categorization of two T2D volunteers to being ND, using normal metrics. A literature search was conducted by using electronic databases (Science direct, google scholar, Medline, Embase, Sport medicine, PubMed, CINAHL, Cochrane library, and Scopus) from April 2015 until January 2019. Key words used are T2D, incretin and exercise.

Method: Each exercise session will consist of a combined exercise protocol of 30 min of resistance exercise followed by 20 min moderate cycling twice a week for 6 weeks. Volunteer should stretch-up for 11 steps of stretching, then the volunteer must cycle for five minutes to warm up. Blood samples collected at base line after S1, S2, S4, S6, S8, S10 and S12. Blood samples centrifuge and refrigerate to be analysed by The Evidence Investigator™ Biochip Array technology (Randox, UK) is a Multiplexing ELISA technology which described previously in section 3.10. It is also analysed by a commercially available enzyme-linked immunosorbent assay (ELISA) with <0.01 cross reactivity with GLP-1 kit as explained in section 3.9.2.

Results: After just six weeks, there was a reduction in the HbA1c level for the T2D volunteers which is significant (P= 0.000). Moreover, in ND the reduction was also significant (P=

0.000). In the T2D group who are using (Metformin and SGT2-I group), their result shows elevation in GLP-1 in the assessment of both acute and chronic effect of the programme. GLP-1 in this group was (3.9 ± 1.5) and increased to (8.4 ± 1.2) , ($P = 0.345$) after S1 and then increased more to (11.0 ± 0.8) , ($P = 0.196$) after 6 weeks of exercise. This was of interest because of the inference that incretins and exercise were linked. The crucial factor is the metformin. Leptin levels increased after 1st exercise session from 7.95 ± 1.8 to 9.15 ± 2.4 ng/ml ($P = 0.707$), the observed increase could be a result of the acute effect of combination of exercise. This increases during the whole exercise sessions and then decreased after S12 to 7.25 ± 1.81 ng/ml ($P = 0.522$) (figure 67). Leptin resistance is also linked to insulin resistance and rheumatoid arthritis, from 1st exercise session to 10th exercise session its level stays slightly high which might be due to leptin resistance. (Yu et al., 2017). On the other hand, the present study showed that the level of leptin slightly decreased in session one from 8.24 ± 3.3 to 7.01 ± 2.4 ng/ml ($P = 0.536$), then increased after 12th sessions to 7.21 ± 3.2 ng/ml ($P = 0.693$) in ND but still lower than the baseline. Recent randomised control study by Nuri et al, found that there was no significant effect of exercise on leptin level (Nuri et al., 2016)

Conclusion: In T2D and ND combination exercise has a beneficial effect on HbA1c, the improvement was higher in T2D. The anthropometric variables (weight, waist, BMI and lung capacity) improved significantly as well in T2D and ND. Exercise is also important to improve GLP-1 secretion. Despite the range of studies on incretin undertaken here, still there is a need to compare the effect of exercise and different types of pharmacological therapy on GLP1. This study compared the effect of exercise on T2D plus medication in volunteers. It has been found that within T2D group only Metformin and SGT2-I group was improved. Both SGLT2 inhibitors and metformin have been found to affect body weight and this may explain the improvement of GLP-1 level, suggesting an area for future investigation. The role of leptin in regulating energy balance has made it an important research variable and in the present study its level was observed where the levels decreased after acute effects, then decreased more after the last exercise sessions in T2D. Moreover, leptin decreased in ND after acute effect and the 12th exercise sessions.



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Biography:

Dr. Nawal Alsubaie is a Clinical pharmacist in Prince Sultan Medical Military City. He Has completed his Msc in clinical pharmacy from UCL and PhD from DMU. He worked as clinical pharmacist in diabetes clinic and was the Deputy of pharmaceutical services for the last years.

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