

THE IMPACT OF EXERCISE AND DIET PROGRAMS ON LOWER URINARY TRACT SYMPTOM IN PEOPLE WITH METABOLIC SYNDROME--A PROSPECTIVELY CONTROLLED STUDY.

Hypothesis / aims of study

Metabolic syndrome (MetS) clustered multiple risk factors of developing chronic diseases. Recent studies revealed MetS and type 2 diabetes are positively correlated with lower urinary tract symptoms (LUTS) in men and women. Moreover, the number of MetS components is positively correlated with the severity of LUTS in women. We evaluated the effect of an exercise-and-healthy-diet-based intervention for 12 weeks on anthropometric data, risk factors of metabolic syndrome and LUTS in community people at risk with metabolic syndrome.

Study design, materials and methods

This was an institutional review board-approved, prospective, non-randomized controlled study. Overweight volunteers with apparently healthy status were recruited. The selection criteria included subjects 20 years old or above with a body mass index (BMI) equal to or greater than 24 kg/m² or a waist circumflex (WC) >85 cm in men or >75 cm in women. All subjects were assigned into either intervention or control group according to their willing. Subjects in the intervention group participated a 12-week program including circuit exercise training combined endurance and resistance exercises (2~3 times per week) and healthy lifestyle modification. People in the control group maintained their usual daily activities. The blood pressure (BP), BMI, WC, serum fasting sugar (FS), serum total cholesterol (TC), triglyceride (TG) level and the American Urological Association Symptom Index (AUA-SI) score and the score of quality of life (QoL) were obtained at baseline and the moment after 3 months' intervention. The AUA-SI was further divided into storage symptom subscore (AUA-SI-S) and voiding symptom subscore (AUA-SI-V). The parameters before and after intervention were analyzed in either group of volunteers.

Results

A total of 44 subjects (22 male and 22 female) with mean age 44.95 (range 27–63) were enrolled in this study consisting of 35 persons in intervention and nine in control group. At baseline, there were no significant differences in gender, age, BP, BMI, WC, FS, TC, TG, AUA-SI total score and QoL between subjects in the two groups except AUA-SI-S was high in the control group. At 3 months, significant decreases of BP, WC, FS, TC, TG ($p=0.000, 0.000, 0.039, 0.002$ and 0.003 respectively) were found in subjects in intervention group but not control group when compared with baseline data (Table 1). However, no significant change could be observed in AUA-SI total score, subscore and QoL in both groups after a three months' experiment (Table 1).

Interpretation of results

The risk factors such as BP, WC, FS, TC and TG could be successfully corrected by a 3 months' program of exercise and healthy diet control in community people at risk with MetS. Yet the LUTS measured by AUA-SI did not reveal significant change in these subjects. A 3 months' duration of amelioration of the pro-inflammatory state in MetS might not be sufficient for improvement of LUTS.

Concluding message

Our results suggested a short-term exercise-and-healthy-diet-based intervention could effectively ameliorate most of the risk factors for MetS but not LUTS in community people at risk with MetS. Further investigation for a long-term intervention might be warranted.

Table 1. Comparison of the anthropometric data, risk factors of metabolic syndrome and LUTS in community people at risk with metabolic syndrome before and after a 3 months' exercise-and-healthy-diet-based intervention.

	Baseline		3 months		p value
	Control (a)	Intervention (b)	Control (c)	Intervention (d)	
Gender	M:6 F:3	M:16 F:19			0.457*
Age (years)	47.2±11.7	44.4±10.9			0.492^
Systolic BP (mmHg)	119.7±5.2	122.3±14.9	109.7±10.2	113.6±12.3	a v. b: 0.602 a v. c: 0.010 b v. d: 0.002
Diastolic BP (mmHg)	74.9±11.3	79.5±10.8	69.1±8.1	69.9±11.4	a v. b: 0.267 a v. c: 0.208 b v. d: 0.000
BMI (Kg/m ²)	26.7±4.2	26.8±3.3	26.5±3.8	26.4±3.5	a v. b: 0.902 a v. c: 0.496 b v. d: 0.072
WC (cm)	90.4±8.5	89.5±9.5	89.8±7.7	85.8±10.2	a v. b: 0.793 a v. c: 0.535 b v. d: 0.000
FS (mg/dL)	90.9±8.8	96.2±30.3	93.1±5.6	92.5±26.4	a v. b: 0.607 a v. c: 0.347 b v. d: 0.039

Total cholesterol (mg/dL)	189.6±37.0	181.0±56.0	190.2±35.7	169.9±49.6	a v. b: 0.669 a v. c: 0.931 b v. d: 0.002
Triglyceride (mg/dL)	111.6±63.6	117.5±71.8	94.8±53.5	93.8±50.6	a v. b: 0.822 a v. c: 0.135 b v. d: 0.003
AUA-SI-V	4.33±3.84	2.37±3.46	4.22±3.73	2.43±3.43	a v. b: 0.145 a v. c: 0.347 b v. d: 0.324
AUA-SI-S	3.11±2.52	1.29±2.07	3.00±2.35	1.26±2.06	a v. b: 0.029 a v. c: 0.347 b v. d: 0.324
AUA-SI-T	7.44±6.19	3.66±5.23	7.22±5.95	3.69±5.22	a v. b: 0.069 a v. c: 0.169 b v. d: 0.571
QoL	1.67±0.87	1.63±1.50	1.56±0.73	1.60±1.44	a v. b: 0.942 a v. c: 0.347 b v. d: 0.324

BP: blood pressure, BMI: body mass index, WC: waist circumflex, FS: fasting sugar, AUA-SI: the American Urological Association Symptom Index, -V: voiding symptom subscore, -S: storage symptom subscore, -T: total score, QoL: the score of quality of life, v.: versus.

* Pearson's Chi test.

^ Independent t test.

a v. b: Independent t test.

a v. c and b v. d: Paired t test.

Disclosures

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Ethics Committee: Institutional Review Board of Taipei City Hospital **Helsinki:** Yes **Informed Consent:** Yes