Impact of a group-based treatment program on adipocytokines, oxidative status, inflammatory cytokines, and pulse wave velocity in obese children and adolescents

Jeerunda Santiprabhob [1], Kawewan Limprayoon [2], Prapun Aanpreung [3], Ratiya Charoensakdi [4], Ruchaneekorn W. Kalpravidh [4], Benjaluck Phonrat [5], Rungsunn Tungtrongchitr [6]

[1] Division of Endocrinology and Metabolism, [2] Division of Respiratory and Critical Care, [3] Division of Gastroenterology, Department of Pediatrics, [4] Department of Biochemistry, Faculty of Medicine Siriraj Hospital, Mahidol University, [5] Department of Clinical Tropical Medicine, [6] Department of Tropical Nutrition and Food Science, Faculty of Tropical Medicine, Mahidol University

Authors have no conflict of interest

OBJECTIVES

- The link between obesity and dysregulation of adipocytokines, inflammatory cytokines and oxidative stress has been found to associate with the pathogenesis of obesity-related complications, such as T2D and CVD [1-3].
- This study aimed to evaluate the effect of a group-based lifestyle modification program on adipocytokines, inflammatory cytokines, oxidative status, and brachial-ankle pulse wave velocity (ba-PWV) in obese youths.

METHODS

- This study was part of a 1-yr uncontrolled prospective study of a group-based treatment program for the management of childhood obesity conducted at Department of Pediatrics, Siriraj Hospital, Mahidol University (Bangkok, Thailand)[4].
- Recruited participants were 8–18 years of age and had percentage weight for height (% wt for ht) >120%
- The intervention consisted of two parts:
  1) an initial hospitalization: to evaluate obesity-related complications and instruct on living a healthy lifestyle
  2) outpatient group-based sessions focusing on lifestyle modification: 5 group sessions held at 1, 2, 3, 6, and 9 mo.
- An OGTT, HMW adiponectin, leptin, IL-6, highly sensitive CRP (hsCRP), superoxide dismutase (SOD), glutathione peroxidase (GPx), and plasma malondialdehyde (pMDA), and ba-PWV were evaluated pre-and post intervention.

RESULTS

- 126 obese youths were recruited (12.3 ± 2.1 yrs, 67 males) and 115 participants completed the study.
- At the end of the study:
  - ✓ % wt for ht, % total fat, leptin, IL-6, hsCRP and ba-PWV decreased
  - ✓ HMW adiponectin increased
  - ✓ no significant change in oxidative status

	Baseline	End of study	p
Weight (kg)	84.8 ± 23.0	84.5 ± 22.1	0.718
Height (cm)	157.3 ± 0.1	161.1± 0.1	<0.001
% wt for ht (%)	181.8 ± 39.1	169.3 ± 36.3	<0.001
BMI (kg/m^2)	33.9 ± 7.2	32.3 ± 6.9	<0.001
WC (cm)	98.5 ± 13.6	94.9 ± 14.0	<0.001
% total fat (%)	48.2 ± 5.1	45.0 ± 6.8	<0.001
Total lean mass (kg)	40.4 ± 8.8	43.2 ± 9.2	<0.001
HOMA-IR	6.7 ± 3.7	5.2 ± 3.7	0.001
Adiponectin (ug/mL)	3.46 ± 4.71	5.03 ± 5.38	<0.001
Leptin (ng/mL)	39.32 ± 24.06	27.22 ± 18.01	<0.001
IL-6 (pg/mL)	45.76 ± 86.22	9.07 ± 31.18	<0.001
GPx (U/gHb)	26.02 ± 8.26	25.14 ± 7.14	0.301
SOD (U/gHb)	2996.5 ± 903.6	3254.5 ± 1204.4	0.076
pMDA (nmol/L)	1.15 ± 0.35	1.07 ± 0.37	0.094
HsCRP (mg/L)	4.9 ± 4.5	3.7 ± 4.5	<0.001
Mean ba-PWV (cm/s)	1035 ± 175	958 ± 161	<0.001

- Change (Δ, before-after) in % wt for ht was positively correlated with Δ leptin (r=0.624, p<0.001) and Δ HOMA-IR (r=0.230, p=0.021) (adjusted for sex and Tanner stage)
- Δ adiponectin was negatively correlated with Δ % total fat (r=-0.289, p=0.003) (adjusted for sex and Tanner stage)
- Δ ba-PWV were positively correlated with Δ pMDA (r=0.233, p=0.036) and Δ HOMA-IR (r=0.253, p=0.025) (adjusted for sex, Tanner stage, Δ %wt for ht, Δ systolic/diastolic BP)

- 24 patients had increase in % wt for ht (6.6 ± 6.8%)
- However, they had increase in muscle mass and decrease in IL-6, leptin, and ba-PWV.

Δ lean mass, mean (95% CI)	-4.4 (-5.9, -2.9)	kg	(p<0.001)
Δ IL-6, mean ± SD	26.6 ± 78.5	pg/mL	(p=0.019)
Δ leptin, mean (95% CI)	6.4 (1.1, 11.7)	ng/mL	(p=0.021)
Δ ba-PWV, mean (95% CI)	74 (8, 140)	cm/s	(p=0.031)

Conclusions

- A group-based healthy lifestyle program for obese youths had beneficial effects on adipocytokines, inflammatory process, and arterial stiffness.
- These improvements may reduce the risk of obese youths developing atherosclerosis.
- Participants without change in weight status also benefited from living a healthy lifestyle, as shown by a reduction in leptin, IL-6, and ba-PWV.

References

1. Bastard JP, Maachi M, Lagathu C, et al. Recent advances in the relationship between obesity, inflammation, and insulin resistance. Eur Cytokine Netw. 2006;17:4-12.
2. Hutcheson R, Rocic P. The metabolic syndrome, oxidative stress, environment, and cardiovascular disease: the great exploration. Exp Diabetes Res. 2012;2012:271028.
3. Ouchi N, Parker JL, Lugus JJ, et al. Adipokines in inflammation and metabolic disease. Nat Rev Immunol. 2011;11:85-97.
4. Santiprabhob J, Leewanun C, Limprayoon K, et al. Outcomes of group-based treatment program with parental involvement for the management of childhood and adolescent obesity. Patient Educ Couns. 2014;97:67-74.

55ESPE 489--P1
Fat metabolism and Obesity
Jeerunda Santiprabhob
DOI: 10.3252/pso.eu.55ESPE.2016
Poster presented at: ESPE 2016 PARIS
PosterSessionOnline.com