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Short Communication

Effect of "wuqinxi" exercise on antioxidant status, intestine *Bacillus acidophilus*, *Lactobacillus casei* and *Bacillus bifidus* in obese old people

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In the present study, we examine effect of "wuqinxi" exercise on antioxidant enzymes activities, lipid peroxidation level, intestine probiotics in obese old people. Results showed that 12 months of "wuqinxi" exercise could markedly enhance blood antioxidant enzymes activities, lipid peroxidation and intestine probiotics count in obese old people. It could be concluded that "wuqinxi" exercise is beneficinal for obese old people.

Key words: Wuqinxi, antioxidant, probiotics.

INTRODUCTION

Qigong is a mind–body exercise originating from traditional Chinese medicine and aim to improve health (Sancier, 1996). In earlier studies, Qigong has been found to reduce stress (Lee et al., 2000; Skoglund and Jansson, 2007), anxiety (Lee et al., 2004), and depression (Tsang et al., 2006) as well as to improve physical activity and balance (Stenlund et al., 2005). Since patients with burnout often report exhaustion and low energy levels, Qigong would be a favourable method in their rehabilitation.

In the present study, we examine effect of "wuqinxi" exercise on antioxidant status, intestine *Bacillus acidophilus*, *Lactobacillus casei*, and *Bacillus bifidus* in obese old people.

METHODS

Design and subjects

This study was conducted with a consecutive convenience sample of 55 obese old people (33 men, age 55-61 and 22 women, 50-60). Approval for the study was obtained from the human subject ethics committees of the involved hospital and university. The purpose of the study was explained to the patients, and written consent was obtained before data collection. All obese old people were asked to practice "wuqinxi" for 2 h every day. The experiment last for 12 months. Blood and faeces were taken from all practicers every three months.

Biochemical analysis

MDA, TC, TG, LDL-c and HDL-c levels, SOD, CAT, GSH-Px activities were measured using commercial kits. *B. acidophilus*, *L. casei*, *B. bifidus* in faeces were counted through a oil immersion lens. The number of viable microorganisms is given in colony forming units (c.f.u.).

Statistical analyses

Results are presented as means±SE. The difference between two measures was established with Student's t test for unpaired samples. To verify the differences among the three measures, an analysis of variance (ANOVA) for repeated measures was performed. Statistical analyses were conducted using Graph Pad

Table 1. Effect of "wuqinxi" on blood MDA level of obese old people.

	3	6	9	12
MDA	6.87±0.34	6.01±0.24*	5.21±0.19**	4.48±0.22**

*P<0.05, **P<0.01, compared with control (3 month).

Table 3. Effect of "wuqinxi" on blood TC, TG, LDL-c and HDL-c levels of obese old people.

	3	6	9	12
TC (mmol/ml)	3.52±0.04	3.15±0.07*	2.82±0.06**	2.61±0.05**
TG	0.72±0.03	0.64±0.02**	0.55±0.01**	0.43±0.02**
LDL-c	0.57±0.02	0.51±0.03*	0.46±0.01**	0.38±0.01**
HDL-c	1.23±0.06	1.54±0.04**	1.78±0.08**	2.04±0.05**

*P<0.05, **P<0.01, compared with control (3 month).

Prism software (San Diego, CA, USA).

RESULTS AND DISCUSSION

The reactive oxygen species (ROS) are known to play a major role in either the initiation or progression of carcinogenesis by inducing oxidative stress (Sun, 1990; Gulcin et al, 2006). Peroxides and superoxide anion ($^{\bullet}O_2^-$) produce cytotoxicity/genotoxicity in cellular system (Gulcin et al, 2006; Gulcin et al., 2008). ROS and nitrogen species are formed in the human body and endogenous antioxidant defenses are not always sufficient to counteract them completely.

Overproduction of reactive oxygen intermediates (O2•–, H2O2, √OH) above the capability of naturally produced antioxidants may result in the instability of critical macromolecules and represents the molecular basis of many diseases including inflammation processes, cardiovascular alterations, and cancer (Halliwell and Gutteridge, 1989; Cerutti, 1985; Meng et al, 2011; Chen et al., 2011; Zhang et al., 2010; Behrooozi et al., 2010).

MDA is a major oxidation product of peroxidized polyunsaturated fatty acids and increased MDA content is an important indicator of lipid peroxidation (Freeman and Crapo, 1981). The results of the present study have also demonstrated that the "wuqinxi" exercise could have affected the MDA concentration in obese old people (Table 1). The present study showed that MDA content significantly decreased in the blood with prolonged exercise time. In addition to the increased level of serum MDA, the blood antioxidant defence system might also be influenced by "wuqinxi" exercise. The present study showed that blood SOD, CAT and GSH-Px activities significantly increased with prolonged exercise time.

Hyperlipidemia or high levels of serum Triglyceride (TG) and cholesterol is a risk factor for premature atherosclerosis. In general, a marked decrease in serum high-density lipoprotein cholesterol (HDL-C) concentrations was shown during infection and/or inflammation in several studies (Sammalkorpi et al., 1988; Cabana et al., 1989; Feingold et al., 1993; Deniz et al., 2006; Reshmi et al., 2010; Remya et al., 2009). In particular, in pneumonia and in inflammatory disorders, such as sarcoidosis, decrease in serum HDL-C concentrations was also shown (Deniz et al., 2006; RodriguezReguero et al., 1995; Kerttula and Weber 1988; Salazar et al., 2000). Generally, plasma LDL-C concentrations are reduced during infection and inflammation. This is believed to be due to a host response to infection and inflammation, which might induce LDL-C oxidation, resulting in lower serum LDL-C concentrations (Cabana et al., 1989; Feingold et al., 1993).

Table 3 summarizes the correlation coefficients describing the relationships between TC, TG, LDL-c and HDL-c parameters in the studied population. As expected, blood TC, TG and LDL-c levels were markedly decreased with prolong "wuqinxi" exercise time. However, blood HDL-c level was markedly increased with prolong "wuqinxi" exercise time.

L. acidophilus (meaning acid-loving milk-bacterium) is a species in the genus Lactobacillus. *L. acidophilus* is a homo-fermentative species, fermenting sugars into lactic acid, which grows readily at rather low pH values (below pH 5.0) and has an optimum growth temperature of 30°C (86 °F) (citation needed). *L. acidophilus* occurs naturally in the human and animal gastrointestinal tract, mouth, and vagina. Some strains of *L. acidophilus* may be considered to have probiotic characteristics (Ljungh and Wadström, 2006).

Table 4 summarizes the effect of "wuqinxi" on intestine *B. acidophilus*, *L. casei*, *B. bifidus* in obese old people. As expected, number of intestine *B. acidophilus*, *L. casei*, *B. bifidus* were markedly increased with prolong "wuqinxi" exercise time.

Table 4. Effect of "wuqinxi" on intestine *B. acidophilus*, *L. casei*, *B. bifidus* in obese old people.

	3	6	9	12
Bacillus acidophilus	5.25±0.12	5.92±0.09	6.93±0.08**	7.48±0.07**
Lactobacillus casei	4.02±0.09	5.06±0.08**	5.72±0.06**	5.99±0.07**
Bacillus bifidus	8.12±0.09	9.81±0.08*	10.79±0.37**	11.61±0.14**

*P<0.05, **P<0.01, compared with control (3 month).

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