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ROLE OF SELF-ESTEEM IN OVERWEIGHT REDUCTION AND YOGA TRAINING INTERVENTION EFFECTS

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SUMMARY

Yoga practice is associated with numerous health improvements, including psychological health and self-control management. Yoga intents methods and techniques which effectively can compensate physical and psychical tensions as lack of movement and the modern life style load on nervous system. The study reports the effects of interventional yoga training for people with overweight. The aim of the study was to develop self-esteem in participants during the yoga training and to accomplish significant changes in overweight reduce of participants. The study was conducted for 336 volunteers (153 males, 183 females) in the three age groups (adolescents, middle age, seniors). Before and after the interventional program the participants were investigated in somatic and psychological tests, e.g. BMI, measuring of diameters of 10 skin folds with calipers, Self-perception gamut and Open sentences questionnaire. Psychological analyze of self-perception and self-esteem level after yoga training in female ES and male ES document self-esteem promotion and a shift from anxiety to state fair, from depressive moods to vitality, from fatigue to force, from confusion and uncertainties to self-respect. In experimental samples (ES) the significant discrepancy between input and check out BMI was perceptible. Also significant positive changes in the reduction of diameters of 10 skin folds were recorded in female and male ES after the yoga intervention. The study results suggest that yoga may be beneficial in overweight management. It can be concluded that regular practice of interventional yoga program for a minimum of three months improves interpersonal characteristics of self-control and self-esteem which help as important qualities in successful body weight reducing.

Key words: self-esteem, overweight reduction, yoga training, somatic and psychic effects of yoga on overweight control

INTRODUCTION

Overweight and obesity has become a major health issue. It is found that obesity decreases the well-being of individuals who report limited self-control, but not otherwise (Fialová, 2004). Self-esteem has a strong relation to happiness. Low self-esteem is more likely than high to lead to depression under some circumstances. Self-esteem mitigates the effects of stress. It is known that keeping weight down not only helps to reduce risk for coronary heart disease, but man also feel that their appearance is greatly enhanced if they are looking trim and in shape (Berger, Pargman, & Weinberg 2002).

Beside whole series of health complication connected with the overweight or obesity, lack of movement and physical activities guide to decline of the life quality. This state is guided to decreasing of the revitalization after working load and to worse usage of free time (Bunc, 2007). Research findings in studies of influence of physical inactivity on the human organism show us, that in muscles with different functional roles across different joints and even muscles across the same joint, may respond differently to unloading, and this should be taken into account in rehabilitation programs after any disuse intervention, which should primarily focus on postural muscles, but should not overlook the non-postural muscles (Pisot et al., 2008). Especially in senior age can be the obesity or overweight a serious chronic disorder, which can be reason of the disability like diabetes, coronary heart disease, hypertension, disorders or psychic diseases. In Czech Republic 66% of men and 54% of women live in senior age with an overweight problem, 16% of senior men and 24% of senior women suffer of the obesity (Schuster, 2009).

The human nervous system is best activated by move. A motion, especially guided and controlled throughout, is of considerable therapeutic value at any age (e.g. Gorny, 1998). As a psychosomatic system, yoga favorably effects on the psychical, somatic and social development of a personality. New body experience and feelings connected with relaxation, controlled rhythm of breathing and slow motions represented a wholly new quality of motion impulses for overweight people (Krejčí, 2008).

By weight reducing in 5–10% patient reaches health progress (Asikainen et al., 2003; Raju, Prasad, Venkata Raman, Murthy, & Reddy, 1997). Various attempts such as physical exercises (Khare & Kawathekar 2002) and dietary modifications (Berg et al., 2003; Djousse, Arnett, Coon, Province, Moore, & Ellison, 2004) and combined diet and exercise trials (Stefanick, Mackey, Sheehan, Ellsworth, Haskell, & Wood, 1998) have been performed to control the lipid content of the blood in efforts to treat and prevent coronary artery disease. A study conducted on patients with angina and coronary risk factors (Mahajan, Reddy, & Sachdeva, 1999) showed a positive response in lipid profile after 4–14 weeks of yogic practices, while another study conducted on subjects with mild to moderate hypertension reported that yoga can play an important role in risk modification for cardiovascular diseases (Damodaran, Malathi, Patil, Shah, Suryananshi, & Marathe, 2002; Maheshwarananda, 2001). Earlier studies of author (Krejčí, 2000; Krejčí, 2003) conducted to evaluate the effect of yoga techniques on self-esteem and self-efficacy had resulted in an improvement in lean body mass and a reduction in thickness after yogic practices. In view of previous research observations, the present research was undertaken to study the effect of yoga training on overweight control and reducing of overweight.

Aim of the study

The aim and goals of the study were:
– to analyze and to describe participants changes in self-control and self-esteem;
– to develop and apply a manageable intervention yoga exercise program for individuals with overweight in 3 different age samples;
– to evaluate significant somatic changes in overweight reduce of participants after the yoga training intervention.

METHODS AND PROCEDURE

Sample description

336 volunteers (153 males, 183 females) in the three age groups (102 adolescents in age: 21.9 ± 1.9; 122 middle age adults in age: 41.9 ± 7.3; 112 seniors in age: 69.5 ± 5.4) absolved the whole procedure of the research project ± from them 176 volunteers (78 males, 98 females) in the Experimental Sample (ES) and 160 volunteers (75 males, 85 females) in the Control Sample (CS). The volunteers were selected for the study from the South Bohemia region in Czech Republic.

Table 1. Samples description in numbers

Sample	Number of participants	Age (mode)	Males		Females	
			ES	CS	ES	CS
Adolescents	102	21.9 ± 1.9	25	25	26	26
Middle – aged adults	122	41.9 ± 7.3	30	30	32	30
Seniors	112	69.5 ± 5.4	23	20	40	29
Sum	336	44.5 ± 4.9	78	75	98	85

Ethical considerations

The study was approved by the national Grant Agency of Czech Republic. Experts and the participants were informed about the purpose of the study and how data would be used. It was emphasized that participation in this study was voluntary and participants were free to withdraw at any time. The information revealed by the participants was kept confidential and only group data were reported. The scope and objectives of the present study were explained to the subjects and their written consent was a necessary condition for participation in the research project.

Before and after the interventional program ES and CS participants were investigated in somatic and psychological tests under supervision of internists and psychologists.

METHODS

(A) Somatic tests:

Body height (cm), Body weight (kg), Body Mass Index (BMI – $kg \cdot m^{-2}$) – (Scale and Altimeter SECCA 703);

Measuring of diameters of 10 skin folds with calipers (Harpenden Skinfold Caliper) (Riegerová, Přidalová, Ulbrichová, 2006);

(B) Psychological tests:

1. Self-perception gamut POP (Válková, Bortoli, & Robazza, 1995) observed the self-efficacyeffect, self-esteem on a real (contemporary) and ideal (future) level;
2. Open sentences Questionnaire (Válková, 2001) analyzed changes in values and self-esteem.

Procedure

Ultrasonic detection of abdomen organs (proportion of liver, spleen, and pancreas) as well as ultrasonic detection of abdomen and diameter of abdomen fat were drawn between 7 am to 8.00 am. On this day of data collection the subjects were asked to abstain from the yogic practices. The following investigations were carried out after – high, weight, BMI, measuring of diameters of 10 skin folds. The above parameters were estimated before commencement of the study (Input Data) and in the end of intervention yoga practice (Output Data). Also psychometric input and output investigations were provide in the same term before end after intervention yoga program.

The yoga interventional program was realized in ES groups in the trimensual coherent cycles. Always once per week a meeting and a training procedure were provided. Here clients learned, what have to do at home every day. Every two weeks the intervention exercise program was changed. The optimum length of the meeting was 45 minutes and of the exercise unit 90 minutes. The intervention program consisted from physical yoga exercises – yoga sets, (was used training program of simple yoga exercises – "*Sarvahitaasanas*" and *asanas* from the System Yoga in daily Life – Maheshwarananda, 2001), Breathing exercises, Relaxation techniques, Concentration techniques, Self-Inquiry meditation techniques to support Self-Esteem by clients, Individualization (tuition, counsel according to particular specifics), Lectures (ethics, life philosophy, stress management, nutrition and drink regime, prevention of the difficulties respective to age specifics). The interventional yoga programs proceed in groups, 12–15 clients met in the lectures and training.

Data analysis of the results were made using Correlation coefficient evaluation, Man-Whitney method, one-way ANOVA with repeated measures and Data mining – 3 methods-classification with algorithm JRip, classification with tree J48 and selective algorithm Best First. P-values of less than < 0.05 were considered significant.

RESULTS

Psychological tests and changes in self-concept, self-esteem and self-control

Participants of all age groups had positive relation to yoga training e.g. to intervention program. They come to practice optionally. They exercised with interest and were grateful. The atmosphere was positive and often full of humor. The program was adapted to the possibilities of each type of groups and individuals, e.g. in the beginning of program seniors exercised on chairs and in second half of program they practiced on yoga mattes. Most frequent subject of talks with trainer was health, family and food. Significantly more often than adolescents, middle-aged adults and seniors wanted to talk about worries and suffer. Often topic was problematic cardio-vascular and respiratory system and bad function of these systems; above all it was discussed cardio problems and diabetes.

Self-perception gamut POP observed the self-efficacy effect, self-esteem on a real (contemporary) and ideal (future) level. For the adolescent ES participants yoga techniques showed a multivariate effect in the domain of self-concept. There was a decrease which characterizes the reduction of discrepancy between self-perception and the ideal image of one's own person. This change indicates the shift in the perception of one's own person to self-control and stability, which leads to a common feeling of subjective contentment, subjective feeling of psychical health and "well-being". In adolescent ES the yoga program had a positive influence in areas of higher self-esteem and positive attitude towards the surrounding world ($F131 = 24.49$; $p = 0.001$). Self-perception changes manifested in adjectives show the direction of the shift: heavy → light, tired → full of energy, rough → tender, difficult → easy. Similar positive changes heavy → light, tired → full of energy were caused in ES of adults and seniors. In ES of seniors "real" level – factor 1 $F120 = 13.029$, $p = 0.001$, factor 3 $F120 = 5.569$, $p = 0.001$, factor 4 $F120 = 35.34$, $p = 0.001$.

In senior ES were found significant differences in gender roles in psychological tests. Preparing the yoga interventional program it was necessary to solve a question of the co-education by exercising in a group. Significant different attitudes were found in ES of seniors between female and male participants. Women were not against co-educative yoga training. In the opposite men preferred to practice separately in men groups only. It seems that overweight or obesity is for male participants very stressful and them afraid of devaluation. In this context it was very useful to use relaxation music in training, to keep self-harmonious and positive access on all. After pass program the participants of all age groups felt better in the mental state. Especially group of male seniors was after interventional program very mentally well-balanced. Interesting is, that at the beginning seniors wish be more rough, than delicate. Perhaps they thought that they are more respected in such kind of role.

Evaluation of "Open sentences Questionnaire" in a pivot table Man-Whitney $p = 0.05$ concludes that ES and CS seniors in opposite to ES and CS adolescents and middle age adults prefer in life good health, peace in the world, satisfaction. Seniors reflected own life and problem of death. They discussed if life has a sense, how to live in this world. They thought much, if life, which till now they had, was correct or bad what about made badly in health context. After intervention it was documented on base of Man-Whitney $p = 0.05$ results a pregnant impact and positive influence of yoga program in ES seniors

on their state of mind to piece. In ES adolescents and middle age adults after intervention program evaluated pivot table Man-Whitney p = 0.05 shows significant change in tendency to be independent and active, e.g. traveling, trips. Among frequent wish belonged to fly by air plane and actively relax in outdoor, to go out in nature. This fact is related to decreasing of overweight and obesity, improvement flexibility bodies and tonic ability after interventional yoga program and to have open way to new sports activities, walking etc. After interventional yoga program evaluation through pivot table Man-Whitney p = 0.05 occurred in ES of all age groups in category "Achievement". This category included tendency something prove, finish, learn something new, manage something, again work in case of seniors, to continue to lose several more kilograms, but above all something prove. This fact exemplifies how the higher or renew self-esteem evokes significantly life style changes.

Somatic Tests Results

Before the intervention the significant differences between ES and KS in all age groups of volunteers were not found. After the intervention in all age groups of ES the significant differences in weight reduce were found.

Table 2. Changes in weight, sum of 10 skin folds and BMI in experimental samples after the intervention program

Sample	Weight reduce	Sum of 10 skin folds reduce	BMI decreasing changes
Female Adolescents	2 kilograms per month	F (60) = 48.811 p = 0.005	F (2.54) = 59.551 p = 0.005
Male Adolescents	1.3 kilograms per month	F (2.43) = 132.68 p = 0.005	Not significant decreasing
Female middle-aged	1.8 kilograms per month	F (60) = 48.811 p = 0.005	F (2.60) = 48.811 p = 0.005
Men middle-aged	1.4 kilograms per month	F (1.59) = 313.27 p = 0.05	Not significant decreasing
Female Seniors	1.8 kilograms per month	F (2.41) = 39.505 p = 0.005	F (2.41) = 38.799 p = 0.005
Male Seniors	1.7 kilograms per month	F (2.41) = 51.461 p = 0.005	Not significant decreasing

Adolescents – men & women

Bigger differences in the weight reduce were found out in the female adolescents ES compared to male adolescents ES. The average weight decrease did 2 kilograms per month in female adolescents ES and 1.3 kilograms per month in male adolescent ES. In female adolescents ES was found out significant difference in the weight reduce compared to female adolescents CS, when F (2.54) = 21.613, p = 0.005 and in the BMI decreasing from 27.1 on 24.8, when F (2.54) = 59.551, p = 0.005. The significant differences were also found out in the sum of 10 skin folds ES – F (2.54) = 208.20, p = 0.005. In the male adolescents ES in the

case of the sum of 10 skin folds was the significant difference ascertained – F (2.43) = 132.68, p = 0.005 (Figure1).

In adolescents CS – female and male – the significant differences in weight reduction, BMI changes and in the reduction of diameters of 10 skin folds were not found. From the mentioned results it follows, that interventional program had positive effects in the overweight reduction in ES of male and female adolescents. The smaller weight decrease in male adolescents was probably evocated due a growth of muscular masses. We can come to a conclusion, that anabolic processes by male adolescents proceed faster than in the female adolescents.

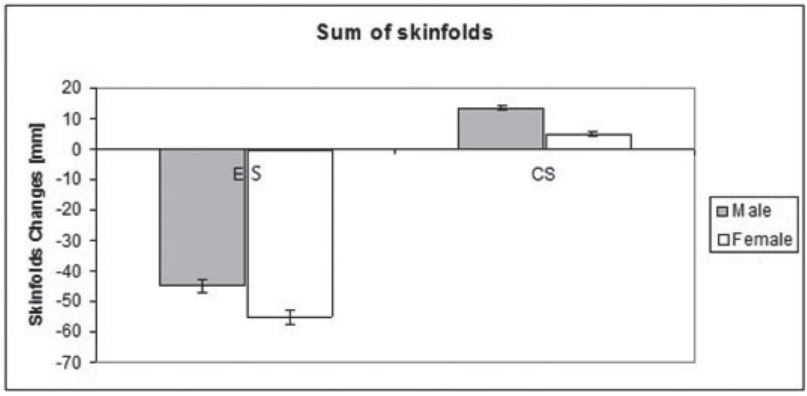

Figure 1. Changes in sum of skin folds after intervention yoga program in Male & Female Juniors (N = 102, ES = 52, CS = 50)

Men & women middle-aged

From the results of male and female ES and CS the significant discrepancy between input and check out BMI is perceptible, in case of CS not. In female ES results is shown a positive fall of the BMI from 28.9 on 26.8 – F (2.60) = 48.811, p = 0.005. The weight reduces decreased in female ES in 1.83 kilograms per month. General sum of 10 skin folds diameters in the female ES is significantly lower – F (60) = 48.811, p = 0.005. In the male ES there was a significant reduction in the levels of sum of 10 skin folds after the intervention program F (1.59) = 313.27 p = 0.05. The average weight decrease did in male ES 1.4 kilograms per month. From the mentioned results follows, that interventional program had again positive effects on overweight or obesity reduction in the middle-aged male and female ES. In male and female CS the significant weight reduce, BMI decrease and the reduction of diameters of 10 skin folds was not found ascertained in the end of intervention period – see Figure 2, 3, 4.

Senior men & women

After the three months interventional program the average weight decrease about1.8 kilograms per month in the female seniors EC and 1.7 kilograms per month in the male seniors

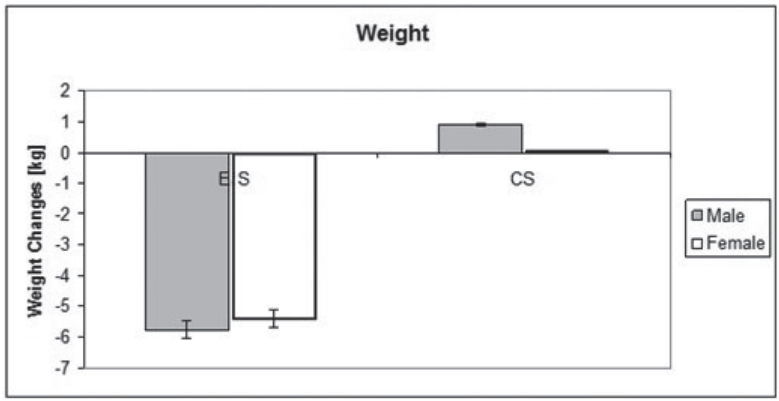

Figure 2. Changes in weight after intervention yoga program in middle aged Male & Female (N = 122, ES = 66, CS = 56)

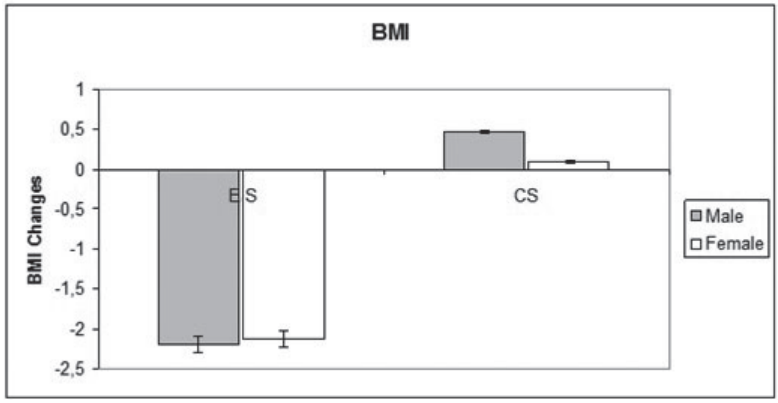

Figure 3. Changes in BMI after intervention yoga program in middle aged Male & Female (N = 122, ES = 66, CS = 56)

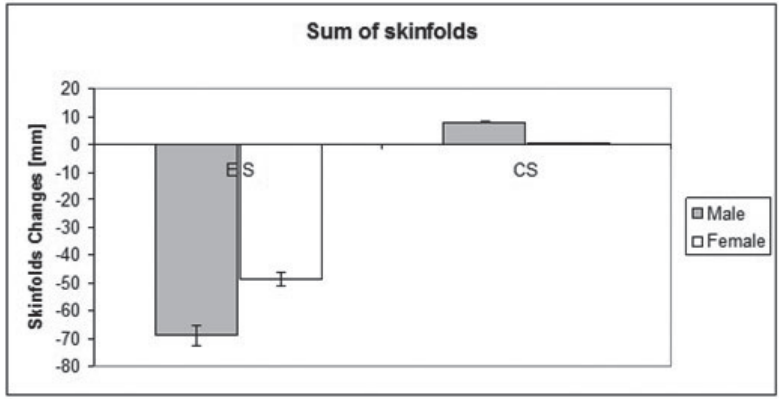

Figure 4. Changes in Sum of Skin folds after intervention yoga program in middle aged Male & Female (N = 122, ES = 66, CS = 56)

EC were recorded. It was found out a significant difference of BMI in female seniors ES – F (2.41) = 38.799, p = 0.005. In the female seniors ES a significant difference was found out in the sum of 10 skin folds ES – F (2.41) = 39.505, p = 0.005. Positive significant fall in the reduction of diameters of 10 skin folds in male seniors EC was ascertained – F (2.41) = 51.461, p = 0.005.

In male and female seniors CS any significant changes in the weight reduction, BMI reduction and reduction of diameters of 10 skin folds in the end of the interventional period were not ascertained.

From Figures 5 and 6 results that after intervention program the weight in ES expressively decreased. In ES Input/output was found the significant difference in weight reduce F (1, 59) = 186.54, p = 0.05, see Figures 5, 6.

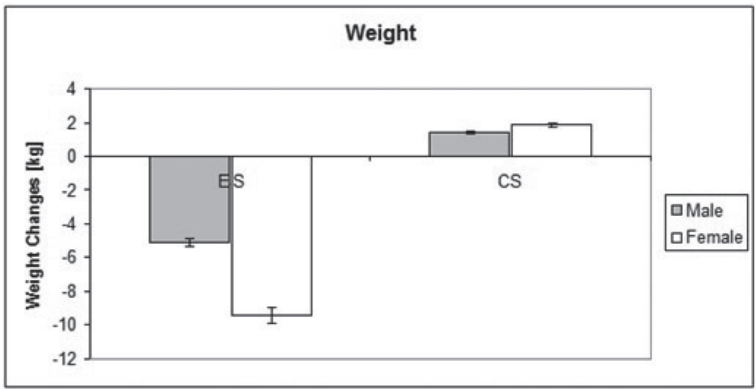

Figure 5. Changes in weight after intervention yoga program in Male & Female Seniors (N = 112, ES = 58, CS = 54)

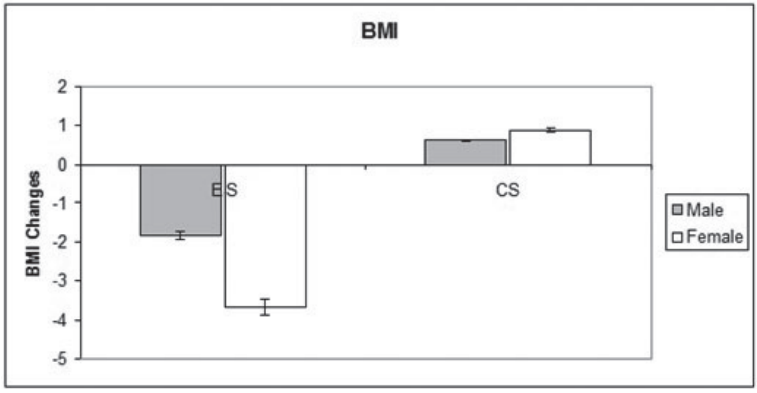

Figure 6. Changes in BMI after intervention yoga program in Male & Female Seniors (N = 112, ES = 58, CS = 54)

DISCUSSION TO INTERVENTION

Participants in all age groups accepted interventional yoga program very positively. Program was realized in all of its planned range. Very favorite was relaxation. After completion of program could all ES participants anonymously in written form express, how they liked yoga program. With negative standpoint to yoga exercising we did not meet at all. Seniors expressed, that exercising them enrich life, that they felt better in mental, social but also in physical health. For some it was the only one possibility in week to have exercise training with expert guiding. Frequent expressions were in context of pains elimination that yoga was for seniors as a beneficial medicine, esp. in case of pains in back and joints. For adolescents in ES the intervention yoga program helped to be aware of healthy life style and general way of living. The participants were used to a completely different conception of exercises. New experience and feelings connected with relaxation, controlled rhythm of breathing and slow motion represented a wholly new quality of motion experience for them. Positive changes were caused by a close connection and inner experience of exercises. A conscious inwardness of every motion and realization of the body part leads to the significant state improvement in a relative short period of time.

The effect of yogic exercise on body mass showed a significant decrease in fat fold thickness is in agree with the study (Khare & Kawathekar, 2002), which suggested that yoga exercises and breathing exercises cause mobilization of fat deposits.

A preservation and growth of the muscular masses in middle age male sample has a great importance for the condition. Such changes are very positive and desirable. Very interesting changes were found in stretching effects and corrective impulses on the body of participants during yoga training. It correlates with participants subjective feelings of comfort after training because spine cord was stretched, fixed and relaxed. According to results of gamut POP, all participants in senior age would like to be bodily and mentally fit. Seniors in ES did not have after the intervention yoga program problems with regulation of their breath and strove breathe deeply and avoid superficial breathing.

In "Open sentences Questionnaire" participants declared problem of adherence on eating. Night eating syndrome is characterized with stress and with poor results at attempts to lose weight. Mastering in relaxation on different levels is an important part of overweight management. The results of study (Pawlow, O'Neil, & Malcolm, 2003) indicated that 20 min. of a muscle relaxation exercise significantly reduced stress, anxiety and after practicing these exercises daily for a week, subjects exhibited lowered stress, anxiety, fatigue, anger, and depression, ratings of hunger, and a trend for breakfast taking and less night-time eating.

Participants expressed also that they found friends in yoga training and that it fact helped them much. Exercises should be motivating. This strategy was the main point of proposed research. Lone knowledge how to take care about health is not very much effective. Much more perspective is to force of self-efficacy and self-respect and independence of people. The postulate is here the statement that only the man, who respects Self, can be really motivated to do something useful for own health.

Very specify in yoga training were corrections of movement stereotypes and synchrony of breath and movement. Yoga movement is relaxed, slow, conscious controlled, coordinated with breathing process. Improving of elasticity and presumed and tested support of metabolic and endocrinology system is benefit for healing of overweight. From this view

we can speak about re-educative effect of yoga exercises on body structure. System of breathing exercises improves cardiopulmonary capacity, improves of tissue aerobic saturation and hypoxia adaptability of tissues. It results in improvement of venous recovery, establishment of correct breath rhythm and in reduction of body and mental tension (Raju, Prasad, Venkata Raman, Murthy, Reddy 1997).

CONCLUSIONS

From the results of male and female ES and CS the significant discrepancy between input and check out BMI is perceptible, in case of CS not.

In female ES results show a higher fall of the BMI then in male ES.

The significant positive changes in the reduction of diameters of 10 skin folds were recorded in female and male in all experimental samples, e.g. in adolescents, middle age and seniors.

A growth of the muscular masses in any age is possible in male organism in overweight management. Anabolic processes supported by regular exercising in male samples manifest in the growth of muscular masses.

After interventional yoga program realization ES participants were able to use separately compensatory and relaxation techniques to negotiation mental fatigue and stress in their everyday life and to be considerate to contiguous people.

On the basis of mentioned results can be concluded that intervention yoga program is suitable form of practicing for individuals with overweight. They need not afraid of training and practicing (e.g. fear of mockery, failure, anxiety, social constraint etc.).

In presented intervention program is recommended to practice 40–60 minutes every day (the average decrease of weight was about 1.5–3 kg monthly) and to improve general condition. Positive changes in emotional state and regulation in sense of self-control and self-esteem improvement are significantly documented.

Findings of study declare that after interventional yoga program and relaxation development were analyzed deepen knowledge in the area of healthy life style and value orientation of seniors. After interventional yoga training program and relaxation development in all age ES groups were found positive changes in opinions and attitudes in meanings interpersonal characteristics of self-efficacy, self-control and self-esteem.

Positive changes in mood states correlate with tests results. Analyses of results brought significant changes in negative emotive factors of gamut POP, as is shift from anxiety to state fair, from depressive moods to vitality, from wrathfulness to humility, from fatigue to force and energy, from confusion and uncertainties to assured and self-respect. On the base of presented results yoga training could be very useful like method improving self-control, self-esteem and mental condition generally in overweight and obesity management.

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ROLE SEBEÚCTY PŘI SNIŽOVÁNÍ NADVÁHY A EFEKTY INTERVENČNÍHO JÓGOVÉHO TRÉNINKU

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SOUHRN

Jógový trénink je často asociován se zlepšením zdravotního stavu včetně duševního zdraví a zvládnutí sebekontroly. Jóga zahrnuje metody a techniky které mohou efektivně kompenzovat fyzické a psychické napětí zapříčiněné např. nedostatkem pohybu a zátěží současného životního stylu na nervový systém. Výzkumná studie předkládá výsledky aplikace a evaluace intervenčního jógového tréninku u lidí s nadváhou. Cílem výzkumu bylo rozvinout sebeúctu u participantů v průběhu jógového tréninku a dosáhnout u nich signifikantních změn při redukci nadváhy. Výzkumná studie byla připravena pro 336 dobrovolných účastníků (153 mužů, 183 žen) ve třech věkových skupinách (adolescenti, lidé ve věku střední dospělosti, senioři). Před intervenčním programem a po intervenčním programu byli participanti vyšetřeni v somatických a psychologických měřeních: BMI, kaliperace deseti podkožních řas, sebepercepční škála POP, dotazník nedokončených vět. Psychologická analýza v ES žen i mužů dokumentuje rozvoj sebeúcty a posun od úzkosti ke stavu pohody, od depresivních nálad k vitalitě, od únavy k aktivitě, od konfúze a nejistoty k sebepotvrzení a sebeúctě. Dále z výsledků u mužů i žen ES byl zjištěn signifikantní rozdíl mezi vstupní a výstupní hodnotou BMI. Také v redukci tloušťky kožních řas byly zjištěny pozitivní signifikantní rozdíly u mužů i u žen ES. Výsledky studie potvrzují, že jóga může představovat užitečný a účinný postup k redukci hmotnosti. Lze vyvodit, že pravidelný intervenční jógový program s minimální dobou tří měsíců vede ke zlepšení sebekontroly a sebeúcty a optimalizaci tělesné hmotnosti.

Klíčová slova: sebeúcta, redukce nadváhy, jógový trénink, somatické a psychické účinky jógy na kontrolu nadváhy

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