

## Lifestyle intervention and quality of life in young obese patients

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### Abstract

The study is aiming to demonstrate the benefits of weight loss following an individualized interval exercise training programme and dietary recommendations on quality of life in young obese patients. *Material and method:* We conducted a 6 months prospective study on 28 young obese patients (mean age 21.3±2.1 years; mean weight 83,66±20,65). Patients were evaluated at baseline and after 6 months of intervention through cardiopulmonary exercise testing (using Cortex Metalyzer 3B system), body composition, (InBody720), and quality of life assessment (SF36 questionnaire). Interval training consisted in 50 minutes sessions, 3 times per week, at intensive endurance training zone (in the range of anaerobic threshold), completed by 1 minute interval in the range between anaerobic threshold and respiratory compensation point, for every 5 minutes of training. IET was supervised and guided by physical therapist. For exercise intensity and caloric consumption monitoring we used Polar RS 800 heart rate monitors. Pedometers were also used in order to achieve 6000 steps/day, in those days in which they also participated in physical training, and 10000 in days without physical training. General dietary recommendations were given to the patients in order to improve their nutritional habits and reduce caloric consumption. All subjects received individualized recommendations for increasing the daily physical activity level. *Results:* At the end of the study we observe significant decrease of weight from 83.66±20.65 kg at 81.58±19.85kg, and increase of  $VO_{2\max}$  from 1.83 ±0.33 l/min to 1.93±0.33 l/min. Regarding life quality - Physical Component Summary increased from 47.88±6.92 to 51.32±6.22, (p=0.01) and Mental Component Summary increased from 47.97±7.28 to 53.42±6.28 (p=0.01). *Conclusions:* 6 months of weight loss programme based on general dietary recommendations and physical training can decrease weight and significantly improve health related quality of life.

**Key words:** weight loss, obesity, individualized interval exercise training, quality of life, physical fitness

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## Rezumat

*Scopul* acestui studiu este de a demonstra beneficiile scăderii în greutate cu ajutorul unui program care combină antrenamentul fizic individualizat pe intervale cu recomandările dietetice generale, asupra calității vieții tinerilor obezi.

*Material și metodă:* Am efectuat un studiu prospectiv cu o durată de 6 luni, pe 28 de pacienți tineri obezi (vârsta medie  $21,3 \pm 2,1$  ani; greutatea medie  $83,66 \pm 20,65$  kg). Pacienții au fost evaluați prin testare cardio-pulmonară la efort, compoziție corporală (InBody720), și evaluarea calității vieții (chestionar SF36), la includere și după 6 luni de intervenție. Antrenamentul fizic a constat în sedințe de 50 de minute, de 3 ori pe săptămână, în zona de duranță intensivă (în zona pragului anaerob), completat de un interval de 1 minut în zona dintre pragul anaerob și punctul de compensare respiratorie, la fiecare 5 minute de antrenament. Pentru monitorizarea consumului caloric și intensității efortului au fost folosite pulsmetre Polar RS 800. În vederea atingerii unui număr de minim 6000 de pași/zi, în zilele în care pacienții au efectuat antrenament fizic, și 10000 pași în zilele fără pregătire fizică, au fost utilizate pedometre. De asemenea, au fost oferite recomandări în vederea îmbunătățirii obiceiurilor alimentare. *Rezultate:* La finalul studiului am observat o scădere semnificativă a greutății de la  $83,66 \pm 20,65$  la  $81,58 \pm 19,85$ kg, și o creștere a  $VO_{2\max}$  de la  $1,83 \pm 0,33$  l/min la  $1,93 \pm 0,33$  l/min. În ceea ce privește calitatea vieții: Scorurile componentelor fizice și psihice ale chestionarului SF\_36, a crescut de la  $47,88 \pm 6,92$  la  $51,32 \pm 6,22$ , ( $p = 0,01$ ) și respectiv de la  $47,97 \pm 7,28$  la  $53,42 \pm 6,28$  ( $p = 0,01$ ).

*Concluzii:* Șase luni de antrenament fizic individualizat pe intervale împreună cu recomandările dietetice generale conduc la scădere în greutate și îmbunătățirea semnificativă a calității vieții la pacienții tineri obezi.

**Cuvinte cheie:** scădere în greutate, obezitate, antrenament fizic cu intervale, calitatea vieții, fitness.

**Mențiune:** Acest studiu a fost finanțat printr-un proiect național de cercetare CNCSIS, cod PD\_382.

## Background

Besides of the medical problems, (cardiovascular disease, insulin resistance and type 2 diabetes, sleep apnea, joint problems, fatty liver disease, gastro-esophageal reflux, certain types of cancers etc.), overweight and obesity can have a negative influence on social life and can be correlated with psychological problems. (1) Two of the most common disorders of modern society, obesity and depression, seem to be correlated. Severe obesity and poor body image, can causes or aggravate depression. (2)

Psychological problems related with overweight and obesity, include low self-esteem, negative self evaluation, decreased self-image, and very often, overweight or obese patients, also confront with social discrimination. (3, 4)

Overweight persons avoid leisure or social activities because of their low self esteem or social rejection. This problem can make even more difficult weight reduction and can bring more physical and psychological problems.

Due to these physical, psychological, or social issues obese patients usually experience a poor quality of life witch decrease proportionally with the increase of weight but can also significant improve with weight reduction. (4,)

HRQL (Health related quality of life), is usually define as a subjective, multidimensional assessment of the physical, psychological, and social domains of health (6).

Scientific literature gives us a lot of evidence for different strategies of losing weight and the effect of weight reduction on life quality.

We hypothesized that a six months weight-loss program based on general dietary recommendation, combined with individually prescribed interval exercise training (IET) programs, would have a great influence on quality of life of the obese patients by the increase of physical fitness and recreational effect of the involvement in physical activities.

The main benefits we have expected from this intervention were weight reduction, improvement of the physical fitness, mood, social behaviour, and general health.

The **aim** of this study is to demonstrate the benefit of a supervised intervention including interval exercise training (IET) and general dietary recommendations, on life quality in young obese patients.

### Material and method

We conduct a 6 months interventional prospective study on 28 young obese patients with a mean age of  $21.3 \pm 2.1$  years and a mean weight of  $83.66 \pm 20.65$  kg.

From total participants to the study, two patients were excluded for low availability to participate on a minimum of 3 training sessions/week.

All patients were tested at inclusion in the study group, and after 6 months of intervention. The evaluation consisted in cardiopulmonary exercise testing (on cycle ergometer, using Cortex Metalyzer 3B system), body composition evaluation (using multy-frequency bioimpedance – InBody720) and quality of life assessment (using SF36 questionnaire). According to the results of cardiopulmonary exercise tests, we establish the effort intensity range, for each patient, in order to achieve the maximum fat oxidation rate during the exercise training.

Interval training consisted in 50 minutes sessions, 3 times per week, at intensive endurance training zone

(in the range of anaerobic threshold), completed by 1 minute interval in the range between anaerobic threshold and respiratory compensation point, for every 5 minutes of training. For the training sessions we used ergometric bicycles, elliptical bicycles, steppers and treadmills.

IET was supervised and guided by a group of physical therapist trained for this purpose. For the monitoring exercise intensity and caloric consumption we used Polar RS 800 heart rate monitors.

All patients were advised to increase the daily physical activity (PA) level. The patients were recommended to achieve 6000 steps/day during the day in which they also participated in exercise training, and 10000 in days without exercise training. Pedometers (Omrone One) were used for supervising the patient's daily physical activity.

General dietary recommendations were given to the patients in order to improve their nutritional habits and reduce daily caloric consumption.

### Analysis

Data were analysed using Anova single factor test with the help of graphPad Prism v.5 statistical program.

### Results

After 6 months of intervention we acquired a significant decrease of weight from  $83.66 \pm 20.65$  kg to  $81.58 \pm 19.85$  kg and a significant improvement of physical fitness ( $VO_2$  increased from  $1.83 \pm 0.33$  l/min to  $1.93 \pm 0.33$  l/min). All components of Health related quality of life (HRQL) improved. (Table I, Figure 1.)

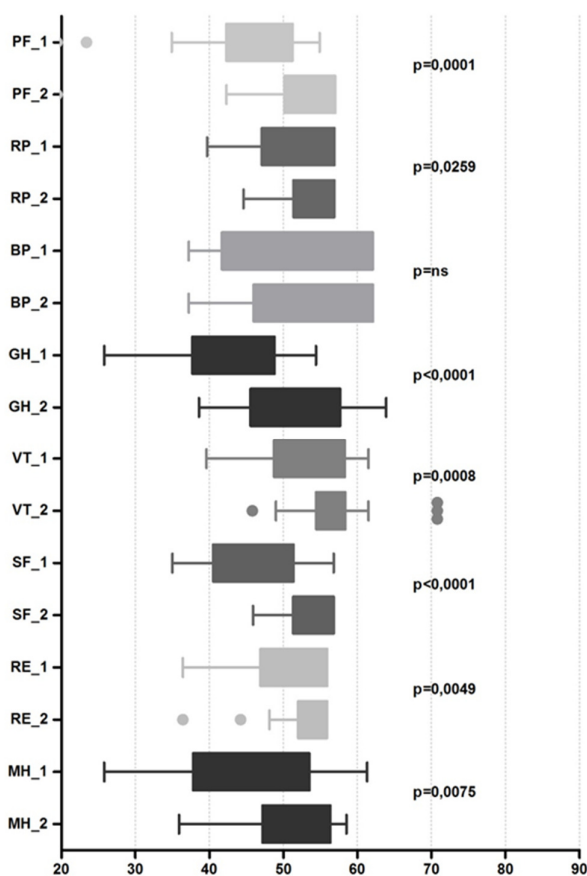
Physical Component Summary (PCS) and also Mental Component Summary (MCS) from SF36

Questionnaire significantly increased from 47.88±6.98 to 51.32±6.22, (p=0.01) and respectively 47.97±7.28 to 53.42±6.278 (p=0.01). (Table I, Figure 2)

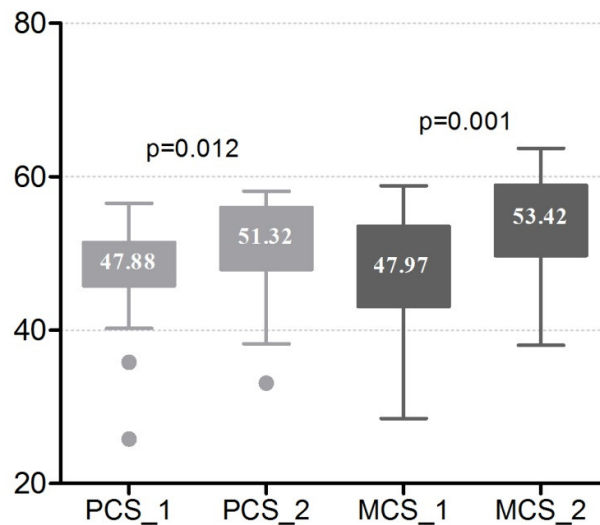
**Table I.** HRQL Parameters evolution after 6 months of intervention

| Parameter | Baseline   | After 6 months | p value |
|-----------|------------|----------------|---------|
| PF        | 45.52±9.45 | 51.18±8.67     | 0.02    |
| RP        | 50.95±5.40 | 53.58±4.17     | 0.04    |
| BP        | 50.91±8.65 | 53.13±8.29     | 0.41    |
| GH        | 43.28±7.69 | 50.43±7.48     | < 0.001 |
| VT        | 51.42±6.34 | 57.49±6.09     | 0.001   |
| SF        | 47.54±6.10 | 53.65±4.41     | < 0.001 |
| RE        | 49.13±5.92 | 52.75±4.68     | 0.05    |
| MH        | 45.60±9.38 | 51.09±6.68     | 0.01    |
| PCS       | 47.88±6.92 | 51.32±6.21     | 0.01    |
| MCS       | 47.97±7.28 | 53.42±6.28     | 0.01    |

Results are presented as mean ± standard deviation. **PF**-Physical Functioning ; **RP**-Role-Physical; **BP**-Bodily Pain; **GH**-General Health; **VT**-Vitality; **SF**- Social Functioning; **RE**-Role Emotional; **MH**-Mental Health; **PCS**-Physical Component Summary ; **MCS**-Mental Component Summary.



**Figure 1.** The increase of HRQL domains scores after 6 months of intervention (SF36 questionnaire).



**Figure 2.** The increase of physical and mental component summary (PCS and MCS) after 6 months of intervention (SF36 questionnaire)

## Discussions

A big variety of weight loss interventions were analyzed in order to determine their effects on quality of life in obese subjects and the SF36 questionnaire, was used by most of the studies on this topic. (7) The majority of these studies indicated that obesity seems to have a greater impact on physical functioning rather than mental functioning. (4, 5)

Weight loss achieved with very low energy diets is difficult to maintain on long-term, but physical functioning subscale seem to remain improved for long periods. (8). Diet is well known as the election method and a very effective one for losing weight, but if is not associated with physical activity, can bring a decrease of resting metabolic rate, and this can lead to failure in future weight loss interventions and can harden the weight maintenance.

Improvements of HRQL domains appear not to be exclusively dependent on weight loss and when weight loss is achieved exclusively with dietary intervention, the result can not be maintained for

long periods of time like in the cases of lifestyle intervention (diet and physical activity). (4)

HRQL improvement it was also reported as the major positive effect of weight reduction after obesity surgery and it was closely related to the magnitude of weight loss. (12) Surgery can bring an improvement in life quality, determining weight loss and trough these reducing cardio-metabolic risk factors, improving self esteem and social relations, but is used only in cases of morbid obesity. (9-11) Also pharmacological approach of the problem can be very efficient but it is known to have many side effects. (13)

Physical and mental HRQL measures are higher in physically active persons. Therefore physical activity seems to have a supplementary effect on HRQL compared with other interventions. (14, 15)

In relation to weight loss and quality of life, physical activity showed a large number of positive effects. Physical training is known to improve mental well-being in the general population, and mental illness or disorders associated with eating behaviour, and

brings an improvement in sleep quality (16,17). This is a very important aspect in weight loss management because a large number of studies correlated sleep quality or duration with eating disorders and obesity, because poor sleep lead to increasing hunger and changes of the eating habits, like craving for fats and sweets. (18, 19)

After all the argument above we can conclude that lifestyle intervention, including dietary behaviour modification and PA seem to be the less expensive and the most easy and efficient method of losing weight and improve HRQL.

In consensus with other studies results, our study show that lifestyle modification programs which include PA, in our case IET, in combination with diet or alimentary behaviour modification, have positive effects on social functioning, mood, and self esteem, among overweight and obese individuals.(20)

Our research highlighted the beneficial effect of combining dietary measures and physical training in obese patients. In addition to weight loss, the intervention that we used determined a reduction of body fat mass and an improvement in VO2max. Probably the improvement of these parameters also contributes to the enhancement of patient's psychological status and quality of life.

Further research is needed in order to determine if the improvements of HRQL components were due to the weight loss exclusively and to quantify the precise exercise training contribution.

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