# Evaluation of a Non-diet Cognitive Behavioural Treatment for Overweight Adults

Maria Langerak, BSc.

E-mail address: m.r.langerak@uvt.nl

ANR: 999745

Running head: Evaluation of a non-diet CBT

Total word count: 3803

Department of Medical Psychology and Neuropsychology

Tilburg University

Reviewers: Dr. G.C.M. van Hout, Catharina Hospital, Eindhoven, the Netherlands.

Prof. Dr. G.L. van Heck, Tilburg University, Tilburg, the Netherlands.

Department of Medical Psychology

Catharina Hospital Eindhoven

Tilburg, 2009

**Abstract**

*Background*: The disappointing results of traditional obesity treatments and the negative effects of dieting have led to the acknowledgement that weight loss may be an inappropriate first and only goal of obesity treatment. Therefore, clinicians and researchers have started to promote "non-dieting". Non-dieting cognitive behavioural treatment (CBT) programs pure calorie restriction in order to lose weight and aim instead to promote healthy eating, to improve participants' well-being, and to encourage physical activity, without a primary emphasis on weight loss.

*Objective:* To evaluate the efficacy of a non-dieting CBT program for weight management.

*Methods:* Participants were assessed at baseline and immediately after the intervention. A subgroup of participants completed one-year follow-up assessments. Outcome measures were psychological well-being, eating behaviour, body-image, health related quality of life (HRQoL), and weight.

*Results:* Forty-eight out of 54 participants completed the intervention. Twelve out of 16 participants completed the one year follow-up measures. Participants demonstrated a small weight loss (1.9 kg), improvements on depressive symptoms and body image, and an increase in restraint eating immediately after the intervention. Unfortunately, none of these improvements were maintained at one-year follow-up.

*Conclusions:* The non-dieting CBT program proved to be successful with respect to reducing depression, improving body image, and producing small short-term weight loss. However, these initial successes could not be demonstrated after one year, possibly partly due to methodological weaknesses and the short duration of the treatment.

Keywords: Overweight; Obesity; Cognitive-behavioural therapy; Non-dieting; Weight management

## INTRODUCTION

Over the last decades, obesity has become a worldwide epidemic with approximately 1.6 billion people (age 15+) who are overweight (BMI ≥ 25) and at least 400 million who are obese (BMI ≥ 30) [1]. Body mass index (BMI) is defined as the weight in kilograms divided by the square of the height in meters (kg/m2) [1]. Obesity and overweight are associated with serious health risks (e.g., cardiovascular diseases, type 2 diabetes, muskoskeletal disorders, and some cancers) as well as negative effects on psychological well-being (decreased quality of life, impaired body image, low self-esteem) [1,3]. Behavioural interventions for overweight and obesity are not very successful in general [2]. Because of the growing global health problem of obesity, it is necessary to re-appraise its management.

Traditional behavioural dietary treatments for obesity emphasize caloric restriction (1,200-1,500 kcal) and an increase in energy expenditure, through physical exercise, to achieve weight loss in a relatively short period. These behavioural treatments were first developed in the 1960s and evolved over the next decades [4]. One development has been the addition of cognitive procedures, such as negative thinking and relapse-prevention. These cognitive-behavioural treatment (CBT) programs are typically delivered in groups of 10-20 participants and involve weekly meetings for 16-24 weeks. Core elements of these treatments are: self-monitoring, the setting of specific realistic goals regarding eating and exercise, the use of stimulus control techniques, lessons on improved nutrition, simple cognitive restructuring, and relapse prevention [5].

In general, these behavioural treatments mainly focusing on weight loss are in general successful in the short-term, but are not very effective in maintaining weight loss on the long-term. They typically induce an average weight loss of 10 % of the initial weight [5]. However, participants usually regain about one-third of their lost weight within the first six months after treatment and return to their baseline weight within five years [5-7].

Furthermore, it has been found that dieting itself may have harmful effects on health and well-being. Frequent dieting, associated with repeated weight loss and regain (weight cycling), is related to medical and psychological consequences. For example, weight cycling is associated with higher cardiovascular and all-cause mortality, and a decline in resting metabolic rate, which increases the proportion of body fat. Strict dieting can lead to pre-occupation with weight and body-image and to poor self-esteem [8-11]. In addition, dieting has been associated with eating disorders (e.g., binge eating), although the literature is inconclusive about the causality of this relationship [12,13].

The disappointing results of behavioural obesity treatments and the negative effects of dieting have led to the acknowledgement that weight loss may be an inappropriate first and only goal of obesity treatment. Therefore, clinicians and researchers have started to promote "non-dieting" [14-16]. Non-dieting CBT programs discourage calorie restriction in order to lose weight and aim instead to promote healthy eating, to improve participants' well-being, and to encourage physical activity [17-19]. The primary emphasis is not on achieving weight loss, although it is clearly recognized that changes in weight might occur as a result of treatment [18].

The scientific literature on non-diet approaches shows positive effects on self-esteem, depressive symptoms, anxiety, and body-image [18-23]. The results on weight, however, are rather inconclusive [24]. Some studies demonstrated weight loss [17-19,21], while others found no change in body weight [20,22,23,25,26]. However, it is interesting to note that in some studies [18,21], weight loss continued during follow-up, which reflects a quite different pattern compared to the outcomes of standard behavioural treatments.

In light of the well-known health risks of obesity, positive change in emotional well-being alone is not regarded as an effective treatment outcome of non-diet treatments.

Improvements in physical as well as in emotional well-being need to be demonstrated by non-diet treatments [17].

During the last three years, a 'non-dieting' CBT program for weight management has been carried out in the Catharina Hospital in Eindhoven, Netherlands. This intervention emphasises a change in lifestyle and eating behaviour without pure caloric restriction. Weight loss was not set as a treatment goal, although it was clearly set that changes in weight may logically occur as a result of change in eating behaviour.

The aim of the present study is to evaluate the efficacy of this particular intervention. First, the effects of the intervention on psychological well-being, eating behaviour, body-image, health related quality of life (HRQoL), and weight are examined. It is hypothesized that the intervention leads to improvements in psychological outcome variables immediately after the intervention. Regarding weight loss, it is expected that the intervention will lead to weight loss immediately after the intervention. In addition, on a subgroup of participants the effects of the intervention are investigated at one-year follow-up. It is hypothesized that after one year, the intervention has lead to continuance or maintenance of improvements in psychological variables. With respect to weight it is expected that the intervention will lead to continuance of weight loss after one year.

## METHODS

### *Participants*

Participants were recruited by local newspaper advertisements and announcements in the Catharina Hospital Eindhoven. The program was described as a group-based weight management program aimed at improving eating behaviours. Respondents were first screened for eligibility in a telephone interview. Participants were eligible if they had a body mass index (BMI) between 25 $kg/m^2$ and 35 $kg/m^2$. Individuals who appeared to be eligible were

invited for an individual exploratory interview. Motivation, weight history, dietary attempts, and eating behaviour were determined using a semi-structured interview with 20 open-end questions especially designed for this study. Participants were excluded if they had an eating disorder (i.e., binge eating disorder or bulimia nervosa), or were involved in any other method of weight management.

*Design*

Participants were recruited and treated in three cohorts of 18-24 participants each. Assessments were completed at baseline and immediately after the intervention. One cohort completed one-year follow-up assessments.

*Treatment*

The treatment was carried out in groups, consisting of nine to 12 participants. All groups met for 12 biweekly sessions of 90 minutes each. The groups were run in the Catharina Hospital Eindhoven and were conducted by a clinical psychologist experienced in the behavioural and cognitive treatment of obesity with assistance of two masters of Medical Psychology students.

The treatment protocol was adapted from a self-help method developed by Van Hout [27]. The aim of the program was weight management through a stepwise, long-lasting change in eating behaviour. Weight loss was not set as a goal of the treatment, even though it was expected that modest weight loss might occur as a result of the lifestyle change.

In the first two sessions attention was given to the motivation of the participants for changing their eating behaviour. Participants learned seven motivation enhancing steps to augment their motivation for chancing their life-style. In these seven motivation enhancing steps participants: (1) wrote down the long-term disadvantages of their current eating behaviour, (2) wrote down the long-term advantages of changing their eating behaviour, (3)

determined if the advantages of their current eating behaviour were real advantages, (4) tried to achieve the advantages of the current eating behaviour in another way, (5) challenged self-undermining and discouraging statements, (6) discovered the causes of overweight and, (7) discovered that certain advantages of change of the current eating behaviour have more long lasting motivating value than other advantages.

In the next three sessions, participants self-monitored their overall food intake and eating behaviour as well as their related thoughts and emotions on a daily basis. Remarkable and recurrent eating patterns were abstracted from their self-monitoring and classified in three categories (external eating, emotional eating and way of eating). Self-control strategies (stimulus-control, stimulus-response intervention and response contingencies) were learned to cope with the unhealthy eating patterns.

In the next five sessions participants set goals to change their unhealthy eating-patterns step by step by using self-control techniques. Weight was kept weekly in a graph to visualize the progress. Social support and hindrance were discussed as well as strategies to cope with it. The importance of physical activity was emphasized. The last two sessions were concerned with the maintenance of progress following the end of the program. Participants did also learn relapse prevention strategies. The program is described in detail in a self-help book [27], which participants used at home to re-read the theory and make homework assignments.

*Measures*

The Dutch version of the Revised Symptom Checklist (SCL-90-R) [28, 29] measures recently experienced (last week) physical and psychological complaints. The questionnaire consists of 90 items, which capture eight dimensions: Phobic Anxiety, Anxiety, Depression, Somatization, Obsessive-Compulsive, Interpersonal Sensitivity and Mistrust, Hostility, and Sleeping Problems. All items together form the main scale Global Severity Index (GSI), which measures

the intensity of perceived psychological and physical distress. Psychometric properties of the Dutch version are good: internal consistency, measured by Cronbach's Alpha, ranged from .73 (Sleeping Problems) to .97 (GSI) and test-retest variability varied from r= .65 (Obsessive-Compulsive) to r= .91 (GSI). Both reliability and validity are evaluated as good [30]. In accordance with other non-dieting studies [23,26] as well as for convenience of comparison, GSI and the dimensions of Depression, Anxiety and Interpersonal Sensitivity and Mistrust are presented.

The Body Attitude Test (BAT) [31] was used to measure body attitude. This 20-item questionnaire consists of the following subscales: Negative Appreciation of Body Size, Lack of Familiarity of One's Own Body and General Body Dissatisfaction. The internal consistency is good, with Cronbach's alpha's ranging from .88 (Negative Appreciation of Body Size and General Body Dissatisfaction) to .90 (Lack of Familiarity of One's Own Body) and the test-retest reliability varying from r= .72 (Lack of Familiarity of One's Own Body) to r= .95 (Negative Appreciation of Body Size) [32].

The Dutch Eating Behaviour Questionnaire (DEBQ) [33,34] was used to measure eating behaviour. The DEBQ has 33 items and consists of three separate scales: (1) Restrained Eating (the tendency to restrict food intake), (2) Emotional Eating (the tendency to eat in response to emotional arousing states), and (3) External Eating (the tendency to eat in response to external food cues). Internal consistency, measured by Cronbach's alpha varies from .72 (obese men) to .95 (non-obese and obese women) [32]. The reliability is sufficient; however, the criterion validity is insufficient [30].

The RAND-36 health survey [35,36] was used to assess health-related quality of life. This generic, widely used scale comprises 36 items that measure eight health concepts: Physical Functioning, Role Limitations due to a Physical Problem, Role Limitations due to an Emotional Problem, Social Functioning, Mental Health, Vitality, Bodily Pain, and General

Health Perceptions. It also includes a single item, which indicates Perceived Change in Health. Internal consistency is moderate to high, with Cronbach's alpha's ranging from .71 (Social Functioning) to .91 (Physical Functioning). The reliability is judged as sufficient; the criterion validity was judged as insufficient [30]. The eight subscales form two summary scales: the Physical Component Summary scale (PCS) and the Mental Component Summary scale (MCS). The PCS is mainly based on the scales Physical Functioning, Role Limitations due to a Physical Problem, Bodily Pain, and General Health Perceptions. The MCS is mainly based on the scales Social Functioning, Role Limitations due to an Emotional Problem, Mental Health, and Vitality. The internal consistency of the PCS ranges from .92 to .94 and the Cronbach's alpha coefficients of the MCS subscale ranges from .87 to .89 [35,36]. In this study, the two summary scales are presented for convenience of comparison.

Weight was self-reported.

*Statistics*

All data analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 15.0. (SPSS for Windows, Rel. 15.0. 2006, SPSS Inc., Chicago, IL, USA).

Frequencies and descriptive statistics were used to summarize socio-demographic characteristics and weight data. Baseline differences between completers and non-completers of the intervention were analyzed with independent *t*-tests for continuous variables and Chi-square tests for dichotomous variables.

Paired sample *t*-tests were used to examine the differences in outcome measures at baseline and immediately after the intervention. Eta squared statistics (effect size) were calculated. According to Cohen's definition, an effect size between 0.01 and 0.06 is considered small, while effect sizes between 0.06 and 0.13 and greater than 0.14 are considered moderate and strong, respectively [37].

Because of the very small sample size at one-year follow-up, Friedman tests (i.e., the non-parametric alternative of the repeated measures ANOVA), were used to examine changes in outcome variables over time (at baseline, end of treatment, and one-year follow-up).

To reduce the probability of committing Type I errors, when making separate comparisons, the Bonferroni procedure was used to adjust the *p* values. Therefore, results were considered significant at *p* values ≤ .004 (i.e., .05/13)

**RESULTS**

Table 1 shows the socio-demographic characteristics of the participants at the baseline assessment. Participants were predominantly female, married, and employed. Forty-eight persons (88.9 %) out of 54 participants completed the intervention. Reasons given for non-completion were: personal reasons (n=3) and the view that the offered treatment was not suitable for their individual needs (n=3). A comparison between completers and non-completers showed that drop-outs scored at baseline significantly lower on the MCS scale ($t$ (52) = 2.38, $p$ = 0.02). No significant differences in any of the other baseline variables or in age, weight, BMI, marital status, education and profession were found.

* Insert Table 1 about here*

Of the 16 participants who were approached at one-year follow-up, 12 (87,5 %) completed these measures. No significant baseline differences between the completers and the non-completers in the follow-up group were found.

The results of the paired sample *t* –tests are shown in Table 2. At the end of the intervention, a significant decrease in weight was found. Mean weight loss was 1.92 kg ($t$ (44)= 3.72, p =

0.001). Weight loss ranged from 1 kg to 14.5 kg. Compared to baseline values 57.8 % of the participants lost weight, 17.8 % gained weight, and 24.4 % remained stable in weight.

A significant ($t$ (47) = 3.02, $p$ = 0.004) reduction in depression was found, which indicates that participants experience less depressive feelings after treatment. With regard to body image too, significant improvements were found. Scores on the subscales General Body Dissatisfaction ($t$ (46) = 3.91, $p$ < 0.000), Negative Appreciation of Body Size ($t$ (46) = 4.39, $p$ < 0.000) significantly reduced over time, indicating that participants were more satisfied with their bodies and appreciated their body size more positive after the intervention. With respect to eating behaviour, a significant change was found on the subscale regarding restraint eating ($t$ (44) = 3.96, $p$ < 0.000). The scores on this subscale increased, which implies that participants were more prone to restrict their food-intake. Regarding HRQoL, no significant changes in the PSC ($t$ (47)= -0.99, $p$ = 0.33) or MSC ($t$ (47)= -2.09, $p$= 0.42) were found.

*Insert Table 2 about here*

The results of the Friedman tests are shown in Table 3. At one year follow up, no significant effect of time was found on any of the outcome measures.

*Insert Table 3 about here*

## DISCUSSION

The aim of this study was to examine the efficacy of a non-diet CBT on psychosocial well-being, eating behaviour, body image, HRQoL, and weight in overweight adults. Effects immediately after the intervention, as well as at one-year follow-up were investigated. By

offering an intervention aimed at improvement in eating behaviour, long- term weight gain could be prevented and psychosocial well-being improved, eventually resulting in sizeable reduction of health risks.

With regards to weight, this study demonstrated a small weight loss (1.9 kg) immediately after the intervention. However, this weight loss was not maintained at one-year follow-up. Furthermore, participants reported less depressive symptoms and body image and demonstrated an increase in restraint eating immediately after the intervention. Again, these results were not maintained after one year.

The results on weight are in accordance with results from previous studies, where non-dieting programs demonstrate small weight losses immediately after the intervention [18-20,23]. Indeed, McGuckin and Foster conclude in their review that: “non-dieting programs result in little change in body weight” (p 506) [25]. There are programs that resulted in larger weight losses, but those typically have incorporated some elements of traditional dieting. The expected maintenance at one-year follow-up, which was found in some previous studies [18,19,22] could not be demonstrated. According to the National Heart, Lung and Blood Institute’s guidelines [38], weight losses of 10% from baseline weight are an appropriate treatment goal. Bearing this in mind, weight loss in this study was discouraging.

The duration of the treatment could be a possible explanation for the small weight losses and other results observed in this study, as well as in non-dieting interventions in general. Most non-dieting interventions consist of weekly meetings during eight to 12 weeks [25]. Since non-dieting programs seek to challenge long-standing believes about weight, eating, physical activity, self-esteem and body image, longer durations of treatments seem to be desirable. It can be very difficult to master behaviour change [39]. Therefore, it is unlikely that long-lasting changes in attitudes and/or behaviour can be accomplished after a two or

three months of weekly meetings. Optimal interventions are likely to last at least six to 12 months [40].

The positive results on depression immediately after the intervention are comparable to other non-diet interventions [18,20,21,24,26]. The finding that the improvements in depression were not maintained at follow-up are may be due to the decline in treatment benefits, once sessions and group support have ceased. It could also have been a consequence of weight regain in a group participants with a history of frequent weight cycling. It has been showed that studies including patients who were treated in behaviourally or medically oriented programs reported uniformly positive changes in mood [41]. For instance, weight regain during follow-up in standard behavioural treatments can attenuate improvements in psychological functioning, with mood sometimes returning to baseline levels [42]. The psychological changes associated with weight regain include increased depressive symptoms and decreased self-esteem, self-confidence, and satisfaction with appearance [43].

The favourable improvements in body image immediately after the intervention are also seen in other non-dieting studies [18,23,26]. However, in the present study, improvements could not be maintained at follow-up. It is presumable that the favourable effects on body image are a consequence of weight loss. Previous research has shown that weight loss is associated with significant improvements in body image; even small losses may yield substantial improvements in body image [44]. Conversely, it has also been found that even small amounts of weight regain (2-3 kg) significantly attenuate the improvements in body image, following weight loss [41, 45]. However, it has also been shown that even in the absence of weight loss, non-diet interventions can produce significant improvements in body image. [26]. Another possibility is that improvements in body image in this study are due to treatment rather than to weight loss and caused a decline once the treatment has ended.

In contrast to some other non-dieting studies [19,26], an increase in restrained eating was found instead of a decrease. However, in these non-dieting interventions letting go restrictive eating behaviours and replacing them with internally regulated eating, was far more emphasized. Another non-dieting CBT, with main goals and strategies quite similar to the program in this study also found an increase in restrained eating [19]. Another possible explanation is that participants with a history of frequent dieting were still inclined to restrict their food intake to achieve more weight loss, in spite of the fact that they were instructed not to do so.

No changes in HRQoL were found. Although, to our knowledge, HRQoL is never assessed in non-dieting studies, more traditional programs show that treatment-induced weight loss is associated with an improvement in HRQoL [41, 46]. However, weight losses in these treatments are mostly larger than those found in non-dieting studies. It could be possible that weight loss in this study was not enough to produce improvements in HRQoL. Another possible explanation is that only a generic measure of HRQoL is used, rather than a more disease-specific measure. On the other hand, the RAND-36 is a validated and widely applied measurement instrument of HRQoL and its major advantage is that it allows comparisons across a variety of conditions. Still, perhaps stronger associations would have been found with disease-specific measures.

The drop-out rate during treatment and at follow-up was low (a rate of 11.1 % during treatment) which is comparable with other non-dieting studies [18,19,23,26]. A possible explanation may be the supportive effect of the group. However, attrition rates in non-dieting studies seem to be rising after 1-2 years of follow-up [26,27], resulting in 50 % attrition, similar to attrition rates in standard behavioural treatments [47].

There are a number of methodological issues that limit the findings of this study. There was a small sample size at follow-up. It is important to note that this was not a

consequence of attrition, but the result of a flaw in the design; participants were not systematically approached for follow-up after one year. The lack of significant results at follow-up, compared to the immediately treatment results and previous research can possibly be partly explained by the small sample size at follow-up. Future research should study a larger sample size. In addition, the generalizability of the results of this study can be questioned, because of the few male participants.

A second limitation is the lack of follow-up beyond one year. Obesity is a chronic condition and, therefore, requires long-term monitoring. However, it is quite unlikely that obese individuals are available for lengthy follow-up without being exposed to other weight management treatments.

The lack of a control group is another obvious limitation of this study. It would be desirable to compare this non-dieting treatment to a wait-list control group, as well as to a standard obesity treatment in order to find out if this treatment is superior to a standard CBT program. There are some controlled trials that show similar results in both the non-diet group and a standard CBT group [18,23]. Moreover, as Foster and McGuckin state in their review: “standard CBT approaches and non-dieting approaches for weight loss have far more in common than might be thought” (p. 508) [25]. Additionally, the lack of a no-treatment control group means that it cannot be differentiated if improvements in outcome variables are attributable to participation in a study or to general improvements in the population. Future research should employ randomized controlled trials.

Another limitation is the reliance on self-report measures for weight and height. Obese women who seek weight loss treatment tend to under-report their weight and over-report their height, suggesting that self-reported data are likely to be inaccurate [48]. Future studies should measure weight and height in a standardized manner.

In conclusion, the non-dieting CBT program proved to be successful with respect to reducing depression, improving body weight, and producing small short-term weight loss. However, these initial successes could not be demonstrated after one year, possibly partly due to methodological weaknesses and the short duration of the intervention.

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Table 1. Sample Demographics

| | N= 54 |
|---|---|
| Sex: | |
| Female | 39 (72.2) |
| Male | 15 (27.8) |
| Age, mean (SD) | 51.93 (10.95) |
| Weight (kg), mean (SD) | 89.06 (11.63) |
| BMI ($kg/m^2$), mean (SD) | 30.48 (2.91) |
| Marital status | |
| Married/cohabiting | 40 (74.1) |
| Single/separated/divorced/widowed | 9 (16.7) |
| Unknown | 5 (9.3) |
| Education: | |
| Basic | 7 (13.0) |
| 'A'-levels/vocational | 17 (31.5) |
| Graduate/post-graduate | 25 (46.3) |
| Unknown | 5 (9.3) |
| Profession: | |
| Employed | 36 (66.7) |
| Unemployed | 15 (27.8) |
| Unknown | 3 (5.6) |

*Note:* values are expressed as number (percentage) of participants unless otherwise indicated.

Table 2.The results of the Paired Sample *t*-tests

| | Pre-intervention | Post-intervention | Eta squared | *T* | P |
|---|---|---|---|---|---|
| | Mean (Sd) | Mean (Sd) | | | |
| Weight | 88.28 (11.93) | 86.36 (12.75) | 0.24 | 3.72 | 0.001* |
| Psychosocial functioning (SCL-90) | | | | | |
| Anxiety | 13.38 (3.79) | 12.33 (2.90) | 0.12 | 2.55 | 0.014 |
| Depression | 24.40 (9.06) | 22.10 (6.69) | 0.17 | 3.02 | 0.004* |
| Interpersonal Sensitivity & Paranoid Ideation | 14.19 (5.42) | 13.29 (4.60) | 0.10 | 2.26 | 0.028 |
| Global Severity Index | 125.75 (38.00) | 119.75 (27.43) | 0.06 | 1.75 | 0.087 |
| Body-image (BAT) | | | | | |
| Negative Appreciation of Body Size | 17.72 (7.81) | 14.79 (8.20) | 0.25 | 3.91 | 0.000* |
| Lack of Familiarity of One's Own Body | 9.53 (6.69) | 8.32 (6.51) | 0.13 | 2.51 | 0.016 |
| General Body Dissatisfaction | 10.57 (4.72) | 8.62 (4.98) | 0.30 | 4.39 | 0.000* |
| Eating Behaviour (DEBQ) | | | | | |
| Restrained Eating | 3.15 (0.71) | 3.49 (0.50) | 0.26 | 3.96 | 0.000* |
| Emotional Eating | 2.95 (0.86) | 2.75 (.77) | 0.09 | 2.15 | 0.037 |
| External Eating | 3.14 (0.66) | 2.92 (.55) | 0.14 | 2.69 | 0.010 |
| HRQoL (RAND-36) | | | | | |
| Physical Component Scale | 74.55 (18.43) | 76.81 (19.00) | 0.020 | -0.99 | 0.326 |
| Mental Component Scale | 71.15 (21.50) | 76.33 (19.76 ) | 0.085 | -2.09 | 0.042 |

*Note: * p≤ 0,004*

Abbreviations: SCL-90-R= Revised Symptom Checklist-90, BAT= Body Attitude Test, DEBQ= Dutch Eating Behaviour Questionnaire, HRQoL= Health Related Quality of Life.

Table 3. The results of the Friedman tests

| Measure | Pre-intervention Mean (Sd) | Post-intervention Mean (Sd) | Follow-up Mean (Sd) | P |
|---|---|---|---|---|
| Weight | 92.13 (13.86) | 89.53 (13.79) | 91.30 (16.45) | 0.035 |
| Psychosocial functioning (SCL-90-R) | | | | |
| Anxiety | 13.33 (2.81) | 12.25 (2.67) | 13.83 (4.53) | 0.121 |
| Depression | 22.42 (3.53) | 20.75 (4.37) | 21.33 (4.16) | 0.513 |
| Interpersonal Sensitivity & Paranoid Ideation | 22.92 (3.97) | 21.42 (3.68) | 21.58 (3.66) | 0.103 |
| Global Severity Index | 124.00 (18.63) | 115.83 (18.45) | 117.75 (17.28) | 0.174 |
| Body-attitude (BAT) | | | | |
| Appreciation of Body Size | 21.00 (8.01) | 17.83 (7.87) | 8.83 (8.65) | 0.028 |
| Lack of Familiarity of One's Own Body | 12.25 (6.40) | 9.50 (6.11) | 9.75 (6.47) | 0.110 |
| General Body Dissatisfaction | 11.75 (4.92) | 9.58 (5.23) | 9.83 (5.86) | 0.065 |
| Eating Behaviour (DEBQ) | | | | |
| Restrained Eating | 3.00 (.53) | 3.38 (.56) | 3.24 (.57) | 0.381 |
| Emotional Eating | 3.37 (.66) | 3.04 (.50) | 3.24 (.38) | 0.122 |
| External Eating | 3.54 (.41) | 3.34 (.46) | 3.36 (.41) | 0.519 |
| HRQoL (RAND-36) | | | | |
| Physical Component Scale | 71.64 (19.10) | 73.52 (19.00) | 73.94 (22.47) | 0.549 |
| Mental Component Scale | 73.43 (15.94) | 79.43 (13.53) | 75.56 (19.25) | 0.436 |

*Note:* Abbreviations: SCL-90-R= Revised Symptom Checklist-90, BAT= Body Attitude Test, DEBQ= Dutch Eating Behaviour Questionnaire, HRQoL= Health Related Quality of Life.