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Results of an adult weight-management program and reflections as the influence of weight on quality of life in patients with obesity

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Summary. *Background and aim:* Recent studies focus on obesity treatment programs that aim at holistically improving metabolic, physical, psychological and social health. This study was conducted to elucidate the results of a hospital-based adult weight-management program in terms of health status and its reflections as the influence of weight on quality of life (QoL) in patients with obesity. *Methods:* This cross-sectional analytical study was conducted with adult (aged>18 y) patients with obesity (Body Mass Index≥30.0 kg/m^2) (n=73) in Outpatient Clinic for Obesity of Çiğli Regional Education Hospital in İzmir/Turkey. Socio-demographic data were collected through face-to-face interviews. Anthropometric measurements (body weight, height, waist&hip circumferences) were taken. Biochemical findings (fasting blood glucose, HbA1c, insulin, blood lipids) were obtained from patient files. Individualized weight loss program was planned by the dietitian. The influence of weight on QoL was determined with Obesity and Weight-Loss Quality-of-Life (OWLQOL) scale. *Results:* Mean age was 42.3±10.3 years; 87.7% were women. Comorbidities were hypertension (23.3%), hyperlipidaemia (19.2%), diabetes mellitus (12.3%). Significant decreases from baseline to post-treatment were found in weight loss (9.55±3.21%), BMI, waist and hip circumferences, waist-to-hip ratio, waist-to-height ratio and body fat percentage. Post-treatment levels of fasting blood glucose, insulin, total cholesterol, HDL and LDL-cholesterol were significantly lower compared to baseline. The OWLQOL score significantly decreased showing less negative influence of weight on QoL. *Conclusions:* This conventional hospital-based weight management program provided reduction in body weight at desired levels, improved metabolic indicators for comorbidities and resulted in improvement in QoL.

Key words: Obesity; Quality of Life; Weight-Related Quality of Life; Weight Loss; Weight Management.

Introduction

Studies in Turkey demonstrate that obesity is a significant health problem in epidemic levels as in the world. Especially 51-64 years-of-age (in both genders) has been reported to be the most prevalent group recently (1, 2). Turkish population-based studies (2-4) have shown that obesity prevalence in Turkish adults is getting higher (males: from 22% to 40%, females: from 38% to 50%). The relationship between health status and increased body weight is well documented (5). The "Milano Declaration" reported by 24 European countries including Turkey, suggested the collaboration of European countries for obesity prevention, diagnosis, treatment and developing national strategies for a plan of action to struggle with obesity. Besides many governmental steps, Turkey has founded Obesity Research Association, which has

shown that 70% of Turkish people had body mass index (BMI) higher than normal (6). The main striking situation was that most of the individuals did not want to see themselves as obese and were trying to get rid of excess weight. Dissatisfaction from obesity resulted from health issues while people with obesity had mobility limitations, exposed to humiliation, neglect and exclusion by the society. Many of them avoided public transportation vehicles and preferred to imprison themselves at home. Obesity brings occupational problems, marital issues which are threatening the quality of life (QoL) (6). As previously highlighted, the QoL is disrupted due to obesity (7, 8). Psychological problems such as poor body image, binge eating behaviour, depression and social dysfunction accompany with obesity (9). While the aesthetic discomfort of weight has been one of the main reasons for applying to the obesity clinic of hospitals (10), how patients with obesity value their weight is important to the QoL impairment (11). Studies have shown a significant decline in QoL in every high BMI degrees (12, 13). Nevertheless, body weight management programs provide an improvement in metabolic profile, symptoms of health-related issues and comorbidities like diabetes, cardiovascular diseases, asthma, sleep apnoea, osteoarthritis besides the QoL (8). Weight management programs for obesity treatment have been reported to improve the health status and QoL of the patients (14-16). To investigate the effect of a conventional hospital-based weight loss program in an outpatient clinic and its reflections on patients' health status and influence of weight on QoL was aimed in this study.

Materials and methods

Subjects

This cross-sectional analytical study was conducted with adult (aged>18 y) patients with obesity (Body Mass Index≥30.0 kg/m^2) (n=73) who applied the outpatient clinic (Setting: Outpatient Clinic for Obesity of Cigli Regional Education Hospital in İzmir/Turkey) for the first time and who followed the program uninterruptedly for at least 3 months. The sample size was calculated according to Gündüzoğlu et al's study (17) (based on BMI finding (33.92±4.16 kg/m^2); alpha=0.05, effect size=0.409, statistical power=0.90) as (at least) 65 patients. This study was planned for the weight management program applied within 4 months at the hospital, and population was composed of patients who applied to the outpatient clinic within this 4 month-term; totally 119 patients applied, so all patients participated were chosen among these patients who met the inclusion criteria based on census method. The study was completed with 73 patients who met the inclusion criteria and who were regularly checked at the controls. For ensuring regular check, a patient that has not come for longer than a month after the last control was excluded from the study. When those patients applied to the outpatient clinic again, they were not included in the study however, they were treated for obesity.

Inclusion criteria: Being an adult (aged>18 y), with a Body Mass Index≥30.0 kg/m^2, applying the outpatient clinic for obesity for the first time, attending controls regularly and uninterruptedly for at least 3 months, not having a mental disease, being voluntary.

Exclusion criteria: Previous application to and/or monitorization in the same outpatient clinic for obesity, aged <18 y, BMI ≤29.99 kg/m^2, inability to communicate.

Data Collection and Procedures

Data of study were collected with a face-to-face interview at baseline and the end of the study (post-treatment). Anthropometric measurements were taken by the dietitian of the clinic. An individual weight loss program was planned based on patient's baseline anthropometric measurements and dietary intake history by reducing the energy intake by 500-1000 kcal/day to provide 0.5-1 kg/week weight loss by the dietitian (18). This program was delivered by a registered dietitian with over 10 years of experience working with patients with obesity. Patients were advised to do regular exercises like brisk walking for a total of 150 minutes per week or 30 minutes per day (19).

Anthropometric measurements: Body weight, height, waist and hip circumferences were taken by the dieti-

tian with proper methods; BMI, waist-to-height and waist-to-hip ratios were calculated (20). Bioelectric impedance method for body fat percentage was used (TANİTA, MC 480, Japan). Patients were classified as I. degree obesity, II. degree obesity and morbid obesity based on BMI and abdominal obesity or at risk of obesity based on waist circumference and waist-to-hip and waist-to-height ratios (20).

Biochemical findings: Biochemical findings (fasting blood glucose, HbA1c, insulin, blood lipids) were obtained from patient files.

Data Collection Tools

Questionnaire form: Socio-demographic data, physical activity and nutritional habits were collected with a structured questionnaire form. The information about health status and diseases of the patients were based on physician-diagnosed patient files.

Obesity and Weight Loss Quality of Life (OWLQOL): This scale which was developed by Patrick et al (21) determines the effect of overweight-related negative conditions on QoL in patients with obesity. Turkish validity and reliability study was conducted by Gündüzoğlu et al (17). It is a 7-Likert type scale including 17 items; responses are indicated on a seven-point scale that ranges from 0 ("not at all") to 6 ("a very great deal"): 0-not at all; 1-hardly; 2-somewhat; 3-moderately; 4-a good deal; 5-a great deal; 6-a very great deal. The scale includes occasion statements showing the condition that patient lives and its impact on QoL. Some of the statements are "Because of my weight, I try to hide my shape", "I feel guilty when I eat because of my weight", "Because of my weight, I try to avoid having my photograph taken", "My weight prevents me from doing what I want to do". The scale is one factor and has no subfields. All items are summed to determine the single score. The raw scores obtained are calculated using the formula and converted to 0-100 standardized pin (17, 21).

$$\text{Score} = \frac{\text{Total score of all items} - \text{The lowest possible score}}{\text{Possible raw score distribution score}} \times 100$$

As the total score from the scale approaches 0, adverse events that patients experience have a less negative impact on QoL, while adverse events that patients experience affect the QoL more adversely when the total score from the scale approaches 100 (17). Cronbach alpha level was found to be 0.928 in this study.

Outcomes

The main outcomes are body weight loss, change in BMI and waist circumference, change in biochemical findings, change in the weight-related QoL measuring the OWLQOL.

Ethical issues

An ethical approval was taken from Non-Interventional Clinical Trials Ethics Committee of Izmir Kâtip Çelebi University Faculty of Medicine (date: 25.02.2016, number: 32) and an institutional approval was obtained from İzmir Provincial Health Directorate. Written informed consent from the patients was provided, in accordance with the Declaration of Helsinki.

Statistical analysis

The sample size was calculated with PASS 11 software. Data were analysed with the statistical package program (SPSS 22.0) by a biostatistician. Findings were summarized with descriptive statistics. Chi-square analysis for comparing qualitative data was used. Shapiro-Wilk test was performed for testing homogeneity. Dependent Two Samples t tests (Paired Samples t-test and Wilcoxon test) were performed for comparison of two groups. $p<0.05$ was set as statistically significant.

Results

The mean age of the patients was 42.3±10.3 years; 87.7% were female. Patients mostly graduated from primary school (43.8%) and were housewives (61.6%), insured worker (13.7%) and retired (11.0%). More than half (57.5%) did not smoke. Most of the patients applied to the outpatient obesity clinic due to weight loss desire (89.0%). Diagnosed chronic conditions were hypertension (23.3%), hyperlipidaemia (19.2%) and diabetes (12.3%). More than half of the patients had insulin resistance (52.1%) (Table 1).

Table 1. Demographic and descriptive characteristics of the patients (n=73)

Demographic and Descriptive Characteristics	n	%
Gender		
Male	9	12.3
Female	64	87.7
Education status		
Not literate	1	1.4
Literate	1	1.4
Primary school	32	43.8
Secondary school	8	11.0
High school	18	24.7
University and higher	13	17.8
Occupation		
Officer	3	4.1
Insured worker	10	13.7
Self-employment	2	2.7
Retired	8	11.0
Student	2	2.7
Unemployed	3	4.1
Housewife	45	61.6
Marital status		
Married	62	84.9
Single	7	9.6
Divorced	2	2.7
Widow	2	2.7
Smoking		
Smokes	15	20.5
Not smokes	42	57.5
Gave up smoking	16	21.9
Alcoholic Drink Consumption		
Drinks	10	13.7
Not drinks	62	84.9
Gave up drinking	1	1.4
Cause of Application to Outpatient Clinic		
Obesity	65	89.0
Diabetes Mellitus	3	4.1
Fatigue-sleepiness	1	1.4
Hypertension	1	1.4
Sweet craving	1	1.4
Frequent hunger	1	1.4
Hypercholesterolemia	1	1.4
Diagnosed conditions (n=54)		
Cardiovascular disease	7	9.6
Hypertension	17	23.3
Hyperlipidaemia	14	19.2
Eye problems	7	9.6
Diabetes Mellitus	9	12.3

As a result of the weight loss treatment (lasting 111.7±13.3 days), exercising habits changed. The ratio of regularly exercising patients increased to 82.2% from 23.3% (baseline) ($p<0.001$) being the "brisk walking" as the favourite exercise (from 19.2% to 75.4%) and staying same in the duration (Table 2).

Baseline and post-treatment anthropometric measurements of patients showed significant changes (Table 3). Body weight (kg) (95.8±17.5 to 86.7±16.7), BMI (kg/m^2) (37.2±5.5 to 33.6±5.3), waist circumference (cm) (108.4±13.6 to 99.2±11.7), waist to hip ratio (0.67±0.79 to 0.62±0.07) and body fat percentage (%) (42.2±4.7 to 38.0±5.8) significantly decreased compared to baseline levels ($p<0.001$ for each variable). Weight loss rate was found to be 9.55±3.21% (2.77% – 17.03%) (Table 3). Of the patients, 97.3% (n=71) had >5% of weight loss.

Post-treatment biochemical findings demonstrated that fasting blood glucose, insulin, total cholesterol, HDL-Cholesterol, LDL-Cholesterol levels significantly decreased compared to the baseline (Table 4).
Mean±SD (Median) OWLQOL scale score was 60.2±22.0 (61.000) at baseline; it was found to be 42.5±20.9 (42.000) after the study (Table 5) ($p<0.001$).

Table 2. Exercise behaviours of patients before and after the study (n=73)

Exercise Behaviours	Baseline		Post-treatment	
	n	%	n	%
Regular exercising	17	23.3	60	82.2
	**X^2=39.000, p<0.001			
Exercise type*				
Brisk walking	14	19.2	55	75.4
Pilates	3	4.1	17	6.6
Exercise severity				
Mild	5	29.4	20	33.3
Moderate	12	70.6	40	66.7
Exercise frequency				
Everyday	8	47.1	19	31.7
Every other day	4	23.5	26	43.3
2 times a week	5	29.4	15	25.0
Exercise duration (minute/week)	50.0±23.1 45.0 (20.0-90.0)		46.8±15.3 45.0 (15.0-100.0)	
	*** Z=-0.431, p=0.667			

*More than one type of exercise was marked by a patient.
**McNemar test was performed.
***Wilcoxon test was performed.

Table 3. Anthropometric measurements of patients before and after the study (n=73)

Anthropometric Measurements	Baseline	Post-treatment	Statistical Analysis
Body weight (kg)	95.8±17.5 91.0 (72.1-153.3)	86.7±16.7 80.8 (61.6-140.6)	Z*= -7.425, **p<0.001**
Weight loss rate (%)	9.55±3.21%, 9.39 (2.77% – 17.03%)		
BMI (kg/m²)	37.2±5.5 35.8 (30.0-58.9)	33.6±5.3 32.3 (25.4-55.2)	Z= -7.424, **p<0.001**
Waist circumference (cm)	108.4±13.6 106.0 (81.0-145.0)	99.2±11.7 96.0 (79.0-129.0)	Z= -7.205, **p<0.001**
Hip circumference (cm)	124.0±10.8 123.0 (108.0-168.0)	116.3±10.1 113.0 (101.0-157.0)	Z= -7.330, **p<0.001**
Waist to hip ratio-FEMALE	0.85±0.06 0.86 (0.71-1.01)	0.84±0.05 0.83 (0.74-0.96)	0.87±0.07 (Baseline) 0.85±0.06 (Post-treatment) t**=3.554, **p=0.001**
Waist to hip ratio-MALE	0.96±0.05 0.99 (0.86-1.04)	0.91±0.06 0.93 (0.77-1.00)	
Waist to height ratio	0.67±0.79 0.66 (0.52-0.85)	0.62±0.07 0.61 (0.47-0.81)	t=12.607, **p<0.001**
Body fat percentage (%)	42.2±4.7 42.4 (25.8-55.4)	38.0±5.8 39.0 (15.2-52.6)	Z= -7.183, **p<0.001**

*Wilcoxon test was performed.
**Paired Samples t-test was performed.

Table 4. Biochemical findings of patients before and after study (n=73**)**

Biochemical Measurements	Baseline	Post-treatment	Statistical Analysis
Fasting blood glucose (mg/dL)	95.8±17.5 91.0 (72.1-153.3)	86.7±16.7 80.8 (61.6-140.6)	Z*= -7.425, **p<0.001**
HgA1c	6.0±0.07 6.0 (6.0-6.1)	5.8±0.4 5.8 (5.5-6.1)	Z= -1.000, p=0.317
Insulin	15.0±8.6 14.3 (4.4-48.6)	12.0±6.4 10.6 (1.2-37.4)	Z= -2.852, **p=0.004**
TSH	1.2±0.2 1.2 (1.0-1.4)	2.2±0.1 2.2 (2.1-2.3)	Z= -1.124, p=0.261
Total cholesterol (mg/dL)	213.9±38.7 211.0 (132.0-308.0)	196.0±32.5 191.0 (122.0-277.0)	Z= -5.016, **p<0.001**
Triglycerides (mg/dL)	139.5±69.8 122.0 (48.0-319)	132.2±64.4 111.0 (42.0-318.0)	Z= -1.079, p=0.280
HDL (mg/dL)	46.2±12.7 45.0 (25.0-87.0)	49.6±15.2 47.0 (25.0-109.0)	Z= -3.126, **p=0.002**
LDL (mg/dL)	137.2±31.7 136.0 (74.0-218.0)	121.3±30.5 121.0 (64.0-202.0)	Z= -5.262, **p<0.001**

*Wilcoxon test was performed.

Table 5. Baseline and post-treatment findings of Obesity and Weight Loss Quality of Life (OWLQOL) Scale

OWLQOL Scale	Number of Items	n	Minimum-Maximum Score	Mean± Standard Deviation	Median	Cronbach Alpha	
Baseline	17	73	13.3-100.0	60.2±22.0	61.000	0.928	Z*= -5.307
Post-treatment	17	73	2.9-88.2	42.5±20.9	42.000	0.938	**p<0.001**

*Wilcoxon test was performed.

Discussion

It is not surprising that the wishes and efforts for weight loss of individuals with obesity are intense considering the health status and QoL outcomes of obesity. Although healthcare professionals are interested in health outcomes, patients prioritize QoL-related consequences rather than metabolic ones (11). This hospital-based weight loss intervention study focuses on both clinical outcomes and reflections as the influence of weight on the QoL of patients with obesity. Significant reductions in body weight, BMI, waist and hip circumferences, waist-to-hip ratio, waist-to-height ratio and body fat percentage were succeeded compared to baseline. A behavioural weight loss program was reported to retrieve significant body weight, BMI, waist and hip circumferences, waist-to-hip ratio changes after 6-month intervention (22). Jenkins et al (23) reported small but significant reductions in body weight and waist circumference in all intervened weight loss treatment groups. Latner et al (24) reported that weight loss program was able to reduce waist circumference and cholesterol, triglyceride, HDL, LDL and insulin levels. It is well known that weight loss improves cardiovascular risk factors, helps prevent or hinder the progress of diabetes by stepping with decreases in blood lipid and glucose profile firstly (11, 18, 24). In this study, fasting blood glucose, insulin, total cholesterol, HDL and LDL levels significantly decreased (Table 4). In a study conducted with guided weight loss treatment, amelioration in clinical physiological indicators such as glucose, HDL cholesterol, triglycerides provided greater improvement in Metabolic Syndrome risk with increasing weight loss (25). Improvements in anthropometric measurements and biochemical parameters showing a clinical wellbeing may be the result of weight loss higher than 5%. Latner et al (24) concluded that 4.86±5.05% weight loss changed cardio-metabolic outcomes and waist circumference favourably. An achievement of 9.55±3.21% weight loss in this study accompanied with reductions in blood lipids, glucose tolerance, and a number of anthropometric measurements. Improved cardio-metabolic and anthropometric findings provide evidence for the significance of this conventional hospital-based standard outpatient obesity treatment. These findings are also consistent with previous reports (24, 26) demonstrating significant associations between modest weight loss (higher than 5%) and improved health status. A high ratio (97.5%) with >5% of weight loss in this study may be due to strict controls and interviews with the dietitian (once in every week during the first month, once in two weeks during 2-6th months) (19), the efficient contact through repeated measurements and feedback. Favourable changes in exercising habits (physical activity advice) may have an effect however the baseline duration of the exercising was found not to change, so counselling activities of the dietitian may have a more powerful impact. Also, conducting an individualized, long-term, uninterrupted weight loss program may be one of the key factors for reaching target weight loss in this study. Burmeister et al (27) reported 3.63±2.93% weight loss within 7-week short-term treatment in 57 patients. Latner et al (24) reported that 42.9% of the combined sample, who received 20 sessions of behavioural weight loss treatment over a six-month period, lost >5% of baseline weight (4.68±5.05%) in the post-treatment phase. The proportion of patients who lost >5% was high, however, because there is not a follow-up period in this study, it is not possible to know whether the health-related improvements sustained over 12th or 18th months.

Since weight loss is accepted as the primary determinant of obesity treatment efficacy by the authorities (19, 28, 29), this study revealed a satisfactory improvement in health status after weight loss which also emphasized its influence on the QoL. In a research review of 36 studies conducted by Lasikiewicz et al (30), health-related QoL was found to have the strongest association with weight loss. In this study, the influence of weight on QoL was measured with OWLQOL. The OWLQOL score significantly decreased meaning a less negative influence of weight on QoL. Also, the ratio of patients frequently living negative situations due to their body weight decreased (data of the scale statements not shown). The stigma of obesity causes low self-esteem and body satisfaction, in addition to the hesitation of social life (31). However, patients felt less avoidance to have their photographs taken or bothering about what other people say about their weight or wearing clothes that hide their shape in this study. Weight loss at the desired level (approximately 10%; 9.55±3.21%) improved QoL by decreasing the influence of overweight on QoL. The improvement in QoL is observed when weight loss

is greater than 5%, being more effective if 10% of initial body weight is lost (30). A behavioural weight loss treatment resulted in significant changes in QoL using Impact of Weight on Quality of Life-Lite scale, providing physical function, public distress, work and body image improvements in the core (24). Mensinger et al (22) determined a significant improvement in QoL of patients followed from baseline to 6th month in their weight loss program. It is essential to understand the ways in which obesity impacts the mental and social well-being components of QoL. Studies indicating an increase in QoL within various durations for weight loss reported vitality and self-esteem increase, mental health improvements and distress decrease (16, 22, 32), being specifically reported an association between vitality and OWLQOL in the literature (33). Weight loss permits the individual to "see" physical changes and improvements, improving body esteem (30). This may be called as a snowball effect; starting with dieting and exercising, continuing with weight loss, waist circumference reduction, improvement in the lipid profile and glucose tolerance which brings a total physical and physiological well-being, and resulting in body image satisfaction, self-esteem and less negative social consequences (advanced QoL) that may have a reciprocal potential and assure healthy weight and life maintenance. Obesity is unfortunately often associated with negative social consequences (34). And measuring obesity-related QoL is challenging (34). Therefore measuring the effect of weight on QoL with a short-time-consuming scale provided a strengthened scope of this conventional hospital-based outpatient weight loss program. While the positive health outcomes obtained in this study indicate the success of treatment, this success also manifests itself by reducing the adverse effect of excess weight on QoL. Despite the necessity of caution in generalising the study results due to elimination of the drop outs, this study sheds light on the potential effectiveness of interventions in the real clinical setting.

Conclusions

This study demonstrates that conventional hospital-based adult weight loss treatment was successful in changing healthy lifestyle behaviours like physical activity, in achieving decrements in anthropometric measurements (body weight, BMI, waist circumference, waist-to-hip ratio, waist-to-height ratio) and physiological cardio-metabolic indices (fasting blood glucose, insulin, total cholesterol, HDL, LDL cholesterol). The psychological well-being found in this study has led to understanding the potential of the impact of weight on QoL which should be taken into consideration by the healthcare professionals during weight loss and obesity treatment programs. Future long-term research should continue to test the implementation and sustainability of conventional hospital-based weight loss programs.

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