

# Evaluation of a Lifestyle Modification Program for Treatment of Overweight and Nonmorbid Obesity in Primary Healthcare and Its Influence on Health-Related Quality of Life

E. Arrebola, MD<sup>1</sup>; C. Gómez-Candela, MD, PhD<sup>2</sup>; C. Fernández-Fernández, PhD candidate<sup>2</sup>; V. Loria, PhD<sup>2</sup>; E. Muñoz-Pérez, RN<sup>1</sup>; and L. M. Bermejo, PhD, MSc<sup>2</sup>

*Financial disclosure:* funded by the Subprograma de Proyectos de Investigación de Evaluación de Tecnologías Sanitarias e Investigación en servicios de Salud of the 2008 Assistance in Strategic Action in Health, as part of the National Spanish Plan for Research and Development 2008-2011.

**Background:** The impact of overweight and nonmorbid obesity on health-related quality of life (HRQL) has not been widely researched. The aim of this study was to evaluate the effects of a lifestyle modification program (LMP) focused on diet, exercise, and psychological support on HRQL in overweight and nonmorbidly obese patients treated in a primary healthcare setting. **Methods:** Sixty patients with grade II overweight and nonmorbid grade I-II obesity were included in this open pilot clinical trial; subjects' ages ranged from 18 to 50 years. They were provided with an LMP combining nutrition education, physical activity, and psychological support. Subjects attended group sessions every 2 weeks. The main outcome measures at baseline and 6 months were body composition parameters (body mass index, body fat percentage, and waist circumference) and HRQL using the 1.4 Spanish version of the SF-36 questionnaire. The questionnaire yields an 8-scale profile of physical

functioning (PF), role—physical (RP), bodily pain (BP), vitality (VT), social functioning (SF), role—emotional (RE), mental health (MH), and general health (GH) factors. **Results:** The LMP achieved improvements in SF-36 subscales at the end of the intervention: PF ( $80.37 \pm 18.90$  vs  $89.40 \pm 13.95$ ,  $P < .001$ ), RP ( $20.37 \pm 9.10$  vs  $23.14 \pm 6.67$ ,  $P < .05$ ), VT ( $58.71 \pm 21.98$  vs  $70.91 \pm 26.56$ ,  $P < .01$ ), SF ( $79.62 \pm 27.76$  vs  $86.57 \pm 25.45$ ,  $P < .03$ ), and GH ( $61.03 \pm 19.13$  vs  $69.42 \pm 18.80$ ,  $P < .001$ ). **Conclusion:** An LMP focused on balanced and moderate energy-restricted diets, increased physical activity, and psychological support may improve the anthropometric parameters and the quality of life in moderately obese patients treated in a primary healthcare center. (*Nutr Clin Pract.* 2011;26:316-321)

**Keywords:** lifestyle; risk reduction behavior; nutrition therapy; quality of life; overweight; obesity

Obesity is a complex disease resulting from the interaction of genetic, metabolic, behavioral, and cultural factors and is becoming a worldwide epidemic.<sup>1</sup> In Spain, the prevalence of being overweight rose from 7.7% at the end of the 1970s to 15.25% in 2006<sup>2</sup>; the prevalence of obesity is estimated to be 15.5%.<sup>3</sup>

From <sup>1</sup>Marqués de Valdeavia Primare Health Care Center, Alcobendas, Madrid, Spain; and <sup>2</sup>Dietetic and Clinical Nutrition Unit, La Paz University Hospital, Madrid, Spain.

Address correspondence to: Laura M. Bermejo López, Nutrition and Functional Food Research Group, IdiPAZ Health Research Institute, Dietetic and Clinical Nutrition Unit, La Paz University Hospital, Paseo de la Castellana, 261, 28046, Madrid, Spain; e-mail: [laura.bermejol@salud.madrid.org](mailto:laura.bermejol@salud.madrid.org).

Overweight is associated with significant risk for diabetes mellitus, hypertension, cardiovascular disease,<sup>4,5</sup> and some types of cancer<sup>6,7</sup>; it may even be related to psychological disorders<sup>8</sup> resulting from discrimination that obese people encounter in societies in which physical appearance is highly valued.<sup>9</sup>

Several observational studies have analyzed the relationship between obesity and health-related quality of life (HRQL). Most of them associated obesity with decrements in quality of life.<sup>10-13</sup> Some studies suggest that physical activity in combination with diet can be effective in improving quality of life in several domains,<sup>14-17</sup> including social and physical function,<sup>11,12,18</sup> although the impact of diet and activity on mental function is not as great as the effect on the other domains.<sup>16,19</sup> Furthermore,

studies provide some evidence that short-term weight loss has a positive effect on HRQL.<sup>20</sup>

Relatively few studies have examined the effects of interventions with lifestyle modification programs (LMPs) on changes in HRQL among overweight and obese individuals. Kaukua et al<sup>21</sup> found evidence of improvements in quality of life by placing morbidly obese individuals on very-low-energy diets that resulted in a rapid weight reduction.<sup>21</sup> Fontaine et al<sup>22</sup> studied moderately obese adults in a 13-week weight loss treatment program. At the end of the intervention study, participants reported improvements in HRQL. Nonetheless, most patients in clinical practice are not extremely obese and have great difficulties complying with programs based on very-low-energy diets.

Therefore, there is a need to investigate whether less severe energy restriction approaches that incorporate healthy eating, physical activity, and psychological counseling can improve HRQL in patients with an average degree of obesity.<sup>23</sup>

For this reason, our study examines improvements in HRQL in overweight but not morbidly obese patients following an LMP focused on diet, exercise, and psychological support.

## Patients and Methods

This pilot project was designed as an open clinical trial to evaluate an LMP focused on diet, exercise, and psychological support to treat overweight and nonmorbid obesity.

A total of 60 patients, aged 18-50 years, with grade II overweight and nonmorbid grade I-II obesity (body mass index [BMI] range, 27-39.9 kg/m<sup>2</sup>) volunteered to participate in the study. Patients were excluded if they reported symptoms of a mental disorder or eating disorder, were smokers, or were on a weight-loss diet. Other exclusion criteria were pregnancy and lactation.

Participants were recruited in successive order of arrival at a primary care center in Madrid. In Spain, primary care centers are the gateway to the health system, where people are treated in an outpatient setting. Prior to study enrollment, subjects provided written informed consent according to the guidelines of the Ethics and Clinical Research Committee of La Paz University Hospital in Madrid.

The study was conducted from June to December 2008. The following data were collected at baseline and 6 months: sociodemographic (gender, age, educational level, and marital status), lifestyle (alcohol consumption, physical activity), anthropometric measurements (weight, stature, BMI in kg/m<sup>2</sup>, waist circumference, body fat percentage), and dietary parameters (energy and nutrient intake). Body fat percentage was measured using bioelectrical impedance analysis with an Omron BF 306 analyzer

(Omron Healthcare, Kyoto, Japan). All foods and drinks consumed by the subjects were recorded using a dietary history, a food frequency questionnaire, and a 3-day food and drink record.<sup>24</sup> Subjects were instructed to record the weights of food consumed if possible or to use household measurements (spoonfuls, cups, etc). The aim was to collect information as accurately as possible, and the subjects were asked to record all intakes even if they broke the rules of their diet. The energy and nutrient contents of foods were then calculated using food composition tables. The values obtained were compared with those recommended<sup>25</sup> to determine the adequacy of the diets. Alimentación y Salud software was used to analyze all data

Moreover, HRQL was assessed at baseline and 6 months (at the end of the intervention) using the Short Form-36 Health Survey (SF-36), version 1.4,<sup>26</sup> valid for a Spanish population.<sup>27,28</sup> This questionnaire evaluates the individual health status in 2 dimensions: functional and emotional. The functional status is divided in 6 subscales: physical functioning (PF), role—physical (RP), bodily pain (BP), vitality (VT), social functioning (SF) and role—emotional (RE). The emotional status includes mental health (MH) and general health (GH) subscales. Scores on all subscales range from 0 to 100 (where higher scores indicate better health status).<sup>29</sup>

All data were collected under the same conditions: the same trained team collected the data at baseline and after 6 months using the same technique; data collection began on the same day of the week and the same measuring instruments were used.

The dietary intervention focused on moderate energy restriction (providing 500 kcal/d less than maintenance requirements) following the principles of a balanced diet in order to achieve a 5%-10% decrease in body weight. The diet was based on a balanced caloric profile (50%-55% calories as carbohydrate, 15%-25% of calories as protein, and <30%-35% calories as fat); dietary reference intakes; a moderate intake of a variety of fats; and a high consumption of fruits and vegetables according to the nutrition recommendations established by WHO/FAO (2003). The physical activity recommendation was for 30 minutes of moderate-intensity physical activity at least 3 days per week. These instructions were given to each subject by a dietitian during a personalized consultation at the beginning of the LMP.

To implement the LMP, participants were asked to attend 11 sessions held every 2 weeks at a primary care center. Each session involved nutrition education, physical activity recommendations, and psychological support. The sessions were led by a doctor, nurse, or dietitian. Each instructor followed a specific program of instruction for the sessions.

A descriptive analysis of quantitative variables was performed using the arithmetic mean as a central trend

**Table 1.** Variation in Anthropometric Parameters Before and After Implementation of a Lifestyle Management Program in Overweight and Obese Subjects

	Baseline (n = 27)	6 Months (n = 27)	P
Weight, kg <sup>a</sup>	86.00 ± 15.65	79.27 ± 13.43	<.001
BMI, kg/m <sup>2a</sup>	32.09 ± 2.98	29.41 ± 2.93	<.001
Waist circumference, cm <sup>a</sup>	104.05 ± 10.07	94.62 ± 9.45	<.001
Adipose mass by bioelectrical impedance, %	41.65	38.82	<.001
CVR waist circumference, % above limit	95.5	63.6	.01

BMI, body mass index; CVR, cardiovascular disease waist circumference limits: men >102 cm; women >88 cm.

<sup>a</sup>Data expressed as mean ± standard deviation.

**Table 2.** Variation in Dietary Intakes and Energy Before and After Implementation of a Lifestyle Management Program in Overweight and Obese Subjects

	Baseline (n = 27)	6 Months (n = 27)	P
Carbohydrates, %	43.26	43.31	.93
Proteins, %	17.15	21.13	.001
Lipids, %	39.56	35.52	.005
Monounsaturated fat, %	53.00	54.38	.10
Polyunsaturated fat, %	17.95	17.50	.57
Saturated fat, %	28.90	28.11	.25
Energy, kcal <sup>a</sup>	2,034.46 ± 535.40	1,751.90 ± 537.72	.002
Cholesterol, mg/d <sup>a</sup>	256.68 ± 95.89	223.74 ± 70.12	.09
Fiber, g/d <sup>a</sup>	21.39 ± 5.14	22.19 ± 7.49	.93
Calcium, mg/d <sup>a</sup>	888.06 ± 260.48	994.15 ± 357.13	.18

<sup>a</sup>Data expressed as mean ± standard deviation.

measure and standard deviation as a dispersal measure. Tables of absolute and relative frequencies were used to describe qualitative variables. Having ensured variance homogeneity, we compared quantitative variables between 2 groups using the Student's *t* test. The Mann-Whitney test was used in instances where groups did not have a normal distribution. The association between qualitative variables was analyzed using the chi-square test. Differences with a probability <.05 were considered significant.

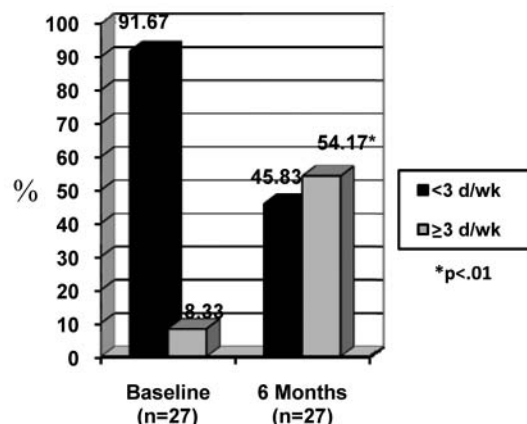
## Results

The percentage of women was higher than men (71% women, 29% men). The mean age of the subjects was 40 ± 9 years. A total of 61% of the individuals were married. The highest education levels of the participants were primary school, 36%; secondary education, 40%; and university studies, 24%. After 3 months, 36 individuals were still involved in the program. By the completion of the program, 33 participants dropped out and 27 completed the program. The risk of dropping out of the study was associated with: smoking cessation in the first 4 months of the

intervention ( $P < .01$ ), BMI  $\geq 35$  kg/m<sup>2</sup> at baseline ( $P < .05$ ), and little exercise (<20 minutes 3 days per week during the intervention period) ( $P < .05$ ). An association between dropout rates and marital status was also observed (dropout rate, 66.7% single vs 26.7% married).

At the end of the program, significant reductions in weight, BMI, waist circumference, and body fat percentage were achieved in those who completed the study (Table 1). The weight reduction achieved was higher than expected at baseline (7% vs 5%), especially in females ( $P < .05$ ). The reduction in waist circumference was of high importance considering that males and females with waist circumference >102 cm and >88 cm, respectively, have increased risk for cardiovascular disease.

After the 6-month intervention, participants who completed the study had reduced their energy intake and changed the caloric profile of their diet (Table 2). The LMP also improved their physical activity patterns: days per week (1.43 ± 1.92 vs 2.36 ± 1.89,  $P < .01$ ); minutes per day (32.61 ± 48.88 vs 70 ± 138.05,  $P < .05$ ), and days in which participants walked at least 10 minutes (4.11 ± 2.48 vs 5.15 ± 2.25,  $P < .01$ ). Moreover, exercise was carried out >3 days per week by an increasing number of individuals (Figure 1).



**Figure 1.** Percentage of subjects exercising at least 3 days per week

**Table 3.** Scores on the Short Form-36 Questionnaire Before and After Implementation of a Lifestyle Management Program in Overweight and Obese Subjects

Dimension	Baseline (n = 27) <sup>a</sup>	6 Months (n = 27) <sup>a</sup>	P
PF	80.37 ± 18.90	89.40 ± 13.95	<.001
RP	20.37 ± 9.10	23.14 ± 6.67	.05
BP	64.44 ± 26.87	67.70 ± 26.23	.50
GH	61.03 ± 19.13	69.42 ± 18.80	<.001
VT	58.71 ± 21.97	70.91 ± 26.56	.01
SF	79.62 ± 27.76	86.57 ± 25.45	.03
RE	20.37 ± 9.05	20.67 ± 8.76	.86
MH	66.86 ± 14.17	71.44 ± 18.41	.10

<sup>a</sup>Data expressed as mean ± standard deviation, BP, bodily pain; GH, general health; MH, mental health; PF, physical functioning; RE, role—emotional; RP, role—physical; VT, vitality; SF, social functioning.

There were improvements in the following subscales of the SF-36 questionnaire: PF, RP, GH, VT, and SF (Table 3).

## Discussion

In this sample of overweight and overweight people, participation in LMP resulted in improvement in anthropometric parameters. Even the amount of weight loss achieved was higher than expected.

Many studies show that diets interventions providing 500-1000 kcal/d less than maintenance requirements result in a loss of 0.5-1 kg/wk within the first 6 months (evidence level I, evidence grade A).<sup>30-32</sup> In our study, the dietary intervention included in the LMP helped participants to decrease their caloric and fat intake and increase

their consumption of proteins; however, subjects did not reach the desired intake for carbohydrates. In this respect, different studies suggest that Mediterranean and low-carbohydrate diets may be effective alternatives to low-fat diets and may result in similar weight loss.<sup>33-35</sup> Moreover, the more favorable effects on lipids (with the low-carbohydrate diet) and on glycemic control (with the Mediterranean diet) suggest that personal preferences and metabolic considerations might require individualized tailoring of dietary interventions.<sup>33</sup>

An effective intervention to prevent and treat obesity in adults is a low-fat diet high in fruits and vegetables combined with exercise.<sup>35</sup> In this study, half of the individuals who had a sedentary lifestyle in the beginning had altered their physical activity patterns, increasing the number of days per week and minutes per day they devoted to exercise by the end of the program.

Another interesting aspect of the LMP was that both mental and physical composite scores improved at the end of the intervention; this was driven by changes in SF-36 subscales: PF, RP, GH, VT, and SF. Other studies showed that modest weight loss improved PF, RF, VT, GH, and MH at the end of a 12-week intervention.<sup>36,37</sup> Blissmer et al<sup>38</sup> found evidence of improvements in PF, GH, VT, and MH using a 6-month behavioral intervention that resulted in a moderate weight reduction in individuals with grade I obesity. Our intervention found improvements in SF but not in MH.

Some studies suggest that it is possible that other factors such as exercise, diet, behavioral patterns, or group interaction have an influence on outcomes.<sup>17</sup> In fact, the LMP intervention implemented in this study achieved a weight reduction of 7%, improving HRQL. Our results parallel the findings of other studies<sup>20,21</sup> suggesting that interventions focused on a combination of diet and exercise can be effective in improving quality of life in obese patients, mainly its social and physical functioning domains.

However, some studies reported no great differences in HRQL among individuals who lost >5% of their weight compared with those who had stable weight and those who gained weight.<sup>39</sup> Because improvements in HRQL do not appear to depend solely on weight loss, additional studies are needed to analyze the impact of each factor included in an LMP on HRQL in overweight and non-morbidly obese patients treated in a primary healthcare setting.

There are several limitations to this study: the small sample size, as it was designed as a pilot trial; the low proportion of male participants; and the high dropout rates (attributable in part to summer holidays). Moreover, the program was implemented in primary healthcare practices, where it is known that many patients do not comply with prescribed treatments.<sup>40</sup> Finally, there is a need to carry out cost-effectiveness analyses of LMP with larger sample sizes.

## Conclusion

An LMP that focused on diet, exercise, and psychological support implemented in a primary healthcare setting helped overweight and obese patients to reduce their body weight, BMI, body fat percentage, waist circumference, and associated cardiovascular risk. These programs could improve both mental and physical HRQL. LMP should be considered for overweight and obese patients in a primary healthcare setting, after assessing the cost-effectiveness through studies on a larger scale.

## References

- WHO/FAO. Diet, nutrition and the prevention of chronic diseases. In: *Joint WHO/FAO Expert Consultation*. Geneva, Switzerland: World Health Organization; 2002.
- Gutiérrez-Fisac JL, Angel Royo-Bordonada M, Rodríguez-Artalejo F. Health-risk associated with Western diet and sedentariness: the obesity epidemic [in Spanish]. *Gac Sanit*. 2006;20(suppl 1):48-54.
- Aranceta J, Pérez-Rodrigo C, Serra-Majem L, et al. Prevention of overweight and obesity: a Spanish approach. *Public Health Nutr*. 2007;10:1187-1193.
- Dallongeville J, Bringer J, Bruckert E, et al. Abdominal obesity is associated with ineffective control of cardiovascular risk factors in primary care in France. *Diabetes Metab*. 2008;34(6 pt 1):606-611.
- Phillips LK, Prins JB. The link between abdominal obesity and the metabolic syndrome. *Curr Hypertens Rep*. 2008;10:156-164.
- Calle EE, Thun MJ. Obesity and cancer. *Oncogene*. 2004;23:6365-6378.
- Li Z, Bowerman S, Heber D. Health ramifications of the obesity epidemic. *Surg Clin North Am*. 2005;85:681-701.
- Doll HA, Petersen SEK, Stewart-Bron SL. Obesity and physical and emotional well-being: associations between body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire. *Obes Res*. 2000;8:160-170.
- Gutiérrez-Fisac JL. Obesity an ongoing epidemic. *Med Clin (Bar)*. 1998;3:456-458.
- Kolotkin RL, Meter K, Williams GR. Quality of life and obesity. *Obes Rev*. 2001;2:219-229.
- Lean ME, Han TS, Seidell JC. Impairment of health and quality of life using new US federal guidelines for the identification of obesity. *Arch Intern Med*. 1999;159:837-843.
- Corica F, Corsonello A, Apolone G, Luchetti M, Melchionda N, Marchesine G. Construct validity of the Short Form-36 Health Survey and its relationship with BMI in obese outpatients. *Obesity (Silver Spring)*. 2006;14:1429-1437.
- Jia H, Lubetkin EL. The impact of obesity on health-related quality of life in the general adult US population. *J Public Health (Oxf)*. 2005;27:156-164.
- Brown DW, Balluz LS, Heath GW, et al. Associations between recommended levels of physical activity and health-related quality of life: findings from the 2001 Behavioural Risk Factor Surveillance System (BRFSS) survey. *Prev Med*. 2003;37:520-528.
- Brown DW, Brown DR, Heath GW, et al. Associations between physical activity dose and health-related quality of life. *Med Sci Sports Exerc*. 2004;36:890-896.
- Wendel-Vos GCW, Schuit AJ, Tijhuis MAR, Kromhout D. Leisure time physical activity and health-related quality of life: cross-sectional and longitudinal associations. *Qual Life Res*. 2004;13:667-677.
- Hassan MK, Joshi AV, Madhavan SS, Amonkar MM. Obesity and health-related quality of life: a cross-sectional analysis of the US population. *Int J Obes Relat Metab Disord*. 2003;27:1227-1232.
- Larsson U, Karlsson J, Sullivan M. Impact of overweight and obesity on health-related quality of life a Swedish population study. *Int J Obes Relat Metab Disord*. 2002;26:417-424.
- Carpenter KM, Hasin DS, Allison DB, Faith MS. Relationships between obesity and DSM-IV major depressive disorder, suicide ideation, and suicide attempts: results from a general population study. *Am J Public Health*. 2000;90:251-257.
- Fontaine KR, Barofsky I. Obesity and health-related quality of life. *Obes Rev*. 2001;2:173-182.
- Kaukua J, Pekkarinen T, Sane T, Mustajoki P. Health-related quality of life in obese outpatients losing weight with very-low-energy diet. *Int J Obes Relat Metab Disord*. 2003;27:1233-1241.
- Fontaine KR, Barofsky I, Bartlett SJ, Franckowiak SC, Andersen RE. Weight loss and health-related quality of life: results at 1-year follow-up. *Eat Behav*. 2004;5:85-88.
- Riebe D, Greene GW, Ruggiero L, et al. Evaluation of a healthy-lifestyle approach to weight management. *Prev Med*. 2003;36:45-54.
- Ortega RM, Requejo AM, López-Sobaler AM. Questionnaires for dietetic studies and the assessment of nutritional status. In: Requejo AM, Ortega RM, eds. *Nutriguía: Manual of Clinical Nutrition in Primary Care*. Madrid, Spain: Editorial Complutense; 2003:456-459.
- WHO/FAO. *Diet, Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation*. WHO Technical Report Series No. 916. Geneva, Switzerland: World Health Organization; 2003.
- Alonso J, Prieto L, Anto JM. The Spanish version of the SF-36 Health Survey (the SF-36 health questionnaire: an instrument for measuring clinical results. *Med Clin (Barc)*. 1995;104:771-776.
- Unitat de Recerca en Serveis Sanitaris. *Manual de puntuación de la versión Española del cuestionario de Salud SF-36*. Barcelona, Spain: Institut Municipal d'Investigació Mèdica; 1998.
- Alonso J, Regidor E, Barrio G, Prieto L, Rodríguez C de la FL. Population reference values of the Spanish version of the Health Questionnaire SF-36. *Med Clin (Barc)*. 1998;111:410-416.
- McHorney CA, Ware JE Jr, Raczek AE. The MOS 36-Item Short-Form Health Survey (SF-36), II: psychometric and clinical tests of validity in measuring physical and mental health constructs. *Med Care*. 1993;31:247-263.
- Salas-Salvadó J, Rubio MA, Barbany M, Moreno B. SEEDO 2007 Consensus for the evaluation of overweight and obesity and the establishment of therapeutic intervention criteria. *Med Clin*. 2007;128:184-196.
- Avenell A, Brown TJ, McGee MA, et al. What are the long-term benefits of weight reducing diets in adults? A systematic review of randomized controlled trials. *J Hum Nutr Diet*. 2004;17:317-335.
- National Institutes of Health. Clinical guidelines on the identification, evaluation and treatment of overweight and obesity in adults: the evidence report. *Obes Res*. 1998;6(suppl 2):51-209.
- Shai I, Schwarzfuchs D, Henkin Y. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *N Engl J Med*. 2009;361:2681. <http://www.nejm.org/toc/nejm/359/3/>
- Boltri JM, House AA, Nelson RM. Clinical inquiries: which strategies work best to prevent obesity in adults? *J Fam Pract*. 2009;58:668-676.
- Stern L, Irbal N, Seshadri P, et al. The effects of low-carbohydrate versus conventional weight loss diets in severely obese adults: one-year follow-up of a randomized trial. *Ann Intern Med*. 2004;140:778-785.
- Fontaine KR, Barofsky I, Andersen RE, et al. Impact of weight loss on health-related quality of life. *Qual Life Res*. 1999;8:275-277.

37. Rippe JM, Price JM, Hess SA, et al. Improved psychological well-being, quality of life, and health practices in moderately overweight women participating in a 12-week structured weight loss program. *Obes Res.* 1998;6:208-218.
38. Blissmer B, Riebe D, Dye G, Ruggiero L, Greene G, Caldwell M. Health-related quality of life following a clinical weight loss intervention among overweight and obese adults: intervention and 24 month follow-up effects. *Health Qual Life Outcomes.* 2006;4:43.
39. Mathías SD, Williamson CL, Colwel HH, et al. Assessing health-related quality of life and health state preference in persons with obesity: a validation study. *Qual Life Res.* 1997;6:311-322.
40. Sackett DL, Strauss ShE, Richardson WS, Rosemberg W, Haynes RB. In: Sackett DL, Strauss ShE, Richardson WS, Rosemberg W, Haynes RB, eds. *Medicina Basada en la Evidencia: Cómo practicar y enseñar MBE.* 2nd ed. Madrid, Spain: Ediciones Harcourt SA; 2001:91-134.