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ARÁN

Nutrición Hospitalaria

Trabajo Original

Epidemiología y dietética

The degree of engagement of overweight/obese adult women in the recommended activities of the Chilean "Vida Sana" program is directly correlated with its effectiveness

El grado de participación de las mujeres adultas con sobrepeso/obesidad en las actividades recomendadas por el programa chileno "Vida Sana" se correlaciona directamente con su efectividad

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Abstract

Introduction: the Chilean Ministry of Health implements the Vida Sana (VS) program with the objective of reducing risk factors for chronic diseases in overweight/obese (OW/OB) individuals, aged 2-64.

Objective: to determine the effectiveness of VS in OW/OB women (20-44 yrs) in terms of their engagement in the recommended activities. These consist of participating in a minimum number each of three core activities (psychologist consultations, lifestyle workshops, and physical activity sessions) during 6 months, to obtain a 5 % weight loss and improved physical fitness (PF).

Methods: a retrospective study involving secondary analyses of the 2017 VS database (n = 5,179 OW/OB women). We determined effectiveness by: a) comparing changes in weight and PF in participants who achieved one or both outcomes, using t-tests and tests of proportions, and b) assessing the probability of achieving the program´s goal, according to participation in 1, 2, or 3 core activities, individually and jointly, using the OR (95 % CI) and trend analysis.

Results: around 32 %, 88 %, and 29 % of women achieved 5 % weight loss, improved PF, and both, respectively. The high percentage of women who improved PF was due to a permissive criterion. Although 20 % of women attained the program´s goal with 0 engagement, among participants, the ORs (95 % CI) for achieving the program´s goal when engaging in 1, 2, or 3 core activities were 1.55 (CI 1.2-2.03), 2.34 (1.76-3.11), and 3.5 (2.21-5.53), respectively.

Conclusion: effectiveness parallels degree of engagement in the recommended activities of VS. A characterization of a program´s participation rate is crucial for improving its effectiveness.

Keywords:

Overweight. Obesity. Physical fitness. Effectiveness. Participation. Chile.

Resumen

Introducción: el objetivo del programa chileno Vida Sana (VS) es reducir los factores de riesgo de enfermedades crónicas en personas de 2-64 años con sobrepeso/obesidad (SP/OB).

Objetivo: determinar la efectividad del programa VS en mujeres SP/OB (20-44 años) a través de su participación en cada una de las actividades recomendadas (consultas con psicólogo, talleres y actividad física) durante 6 meses, para lograr perder un 5 % de peso y mejorar la condición física (CF).

Métodos: estudio retrospectivo con análisis secundario de la base de datos VS de 2017 (n = 5179 mujeres SP/OB). Se determinó la efectividad: a) comparando los cambios en el peso y la CF de las participantes que lograron uno o ambos resultados, usando el test de la "t" y el de proporciones; b) evaluando la probabilidad de lograr el objetivo de acuerdo con la participación en 1, 2 o 3 actividades, de manera individual y conjunta, calculando los OR (IC 95 %) y el análisis de tendencias.

Resultados: el 32 %, 88 % y 29 % de las mujeres perdieron un 5 % de peso, mejoraron la CF o consiguieron ambas cosas, respectivamente. El alto porcentaje que mejoró la CF se debió a un criterio permisivo. Aunque el 20 % de las mujeres lograron el objetivo del programa con una participación "0", los OR (IC del 95 %) de lograr el objetivo al participar en 1, 2 o 3 de las actividades fueron de 1,55 (IC: 1,2-2,03), 2,34 (IC: 1,76-3,11) y 3,5 (IC: 2,21-5,53), respectivamente.

Conclusión: la efectividad del programa VS se asocia directamente con el grado de participación en las actividades. Caracterizar la participación de un programa es clave para mejorar su efectividad.

Palabras clave:

Sobrepeso. Obesidad. Condición física. Efectividad. Participación. Chile.

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INTRODUCTION

Chile has a very high prevalence of overweight, obesity, and weight-related comorbidities (1). The most recent National Health Survey (ENS) 2016-2017, a nationally representative survey applied to subjects 15 years and older, showed the following results for men: 43.3 % overweight, 30.3 % obese, 83.3 % sedentary, 10.6 % with diabetes, 27.5 % with hypertension; for women, these figures were: 36.4 %, 38.4 %, 90 %, 14 %, and 27.7 %, respectively (2).

There is ample evidence that behavioral factors, namely poor diet and physical inactivity, are the main causes associated with overweight and obesity (3-5), and because obesity-related diseases in adults produce a heavy burden on the health care system, effective weight management programs should be implemented (6-9).

Compared to weight management programs with either diet or physical activity, those that combine these two components have been found to be more effective (10). Based on this evidence, the Ministry of Health in Chile implemented the "Vida Sana" (VS) (translation: healthy lifestyle) program, a nation-wide program with the aim of preventing weight-related comorbidities in overweight and obese subjects (11).

As explained in a previous article (12), this program was originally designed as a 12-month intervention for overweight individuals 6-45 years of age; however, duration was shortened to 6 months, and the age range was expanded to include individuals aged 2 to 64 years, as the prevalence of overweight and obesity in preschool children and older adults had risen over the past decade (13).

Because VS participants include both children and adults, and the criteria to evaluate the program´s goal is different for those under and over 20 years of age, we initially decided to determine the effectiveness separately for children and adults. Results for participants under 20 years showed that the program´s activities contributed significantly to a decline in BMI Z-score and improved fitness (determined with 3 tests) in subjects of 2-5 years of age; however, in 6-10- and 11-19-year-old participants its contribution was low. Overall, only half of participants improved their nutritional status and fitness during the 6 months of intervention (12). For adults, the goal of VS is to help participants achieve a clinically significant weight loss, at least 5 % of their initial weight, and improve physical fitness (PF), defined as either maintaining or increasing the distance walked during the 6-minute walk test (6MWT), but decreasing post-test heart rate (14).

Therefore, the objective of this article is to determine the effectiveness of the VS program in adult participants (in this case, 20-44-year-old women, because they make up the largest proportion of adults) based on their participation rate in the program´s core activities.

MATERIALS AND METHODS

SAMPLE

We obtained the anonymized database of Vida Sana 2017 from the Ministry of Health. The professionals who deliver the program's activities register the data locally, and the Ministry of Health merge all data into a national database. The initial sample included 6,654 overweight and obese adults (BMI, 25-29.9 kg/m^2 and ≥ 30 kg/m^2, respectively) who had data on fitness (6 min walk test + heart rate) at baseline and at 6 months (follow-up). Of a total of 526 primary health centers where VS is implemented in the country, the study sample included participants from 425 centers (81 %). Because only a small proportion of adults were men (5.6 %), they were excluded from the analysis. The initial sample was then checked for plausibility of the data on nutritional status (NS) and physical fitness (PF) at baseline and follow-up. Plausibility considered the following: BMI ≥ 25 and < 50 kg/m^2 plus a baseline heart rate before applying the 6 min walk test (6MWT) of 60-100 beats per minute (bpm) (15), a heart rate at follow-up upon finishing the test and after 10 minutes of 60-220 bpm, and a maximum distance of 750 m (this is an average figure for adults according to Chilean standards) (16). After this process, the study sample included 5,179 women, aged 20-44 years (Fig. 1).

DESCRIPTION OF THE VIDA SANA PROGRAM

Professionals including psychologists, nutritionists, and physical education (PE) teachers/kinesiologists were hired to implement the program. Once a year these professionals from the whole country attend a 3-day workshop where they are instructed on the different core activities, and learn about the known barriers to implementation.

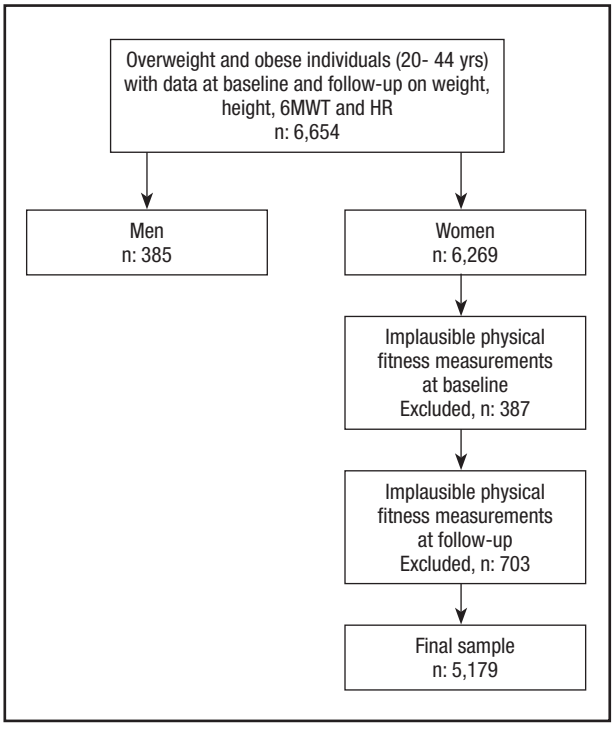

Figure 1.

Sample selection flowchart for the Vida Sana program in 2017. 6MWT: 6-minute walk test; HR: heart rate.

As previously explained (12), beneficiaries can participate in the program after they consult with a medical doctor who determines whether they meet the program's inclusion criteria. The program´s components include: 2 individual sessions with a nutritionist, 2 with a psychologist, 5 healthy lifestyle workshops, and 3 weekly physical activity sessions (PAS). Although the names of the core activities for younger and adult participants are the same, the aspects addressed and evaluation methods are different.

Participants attend 2 sessions with a nutritionist who, apart from determining pre- and post-intervention anthropometric measurements, recommends a healthy food plan.

Regarding the individual sessions with a psychologist, in the first session reflections on attitudes and motivations towards certain behaviors are discussed and specific short-term goals are set with the participant, while the second session evaluates the process and determines whether the goals were achieved. Regarding the physical activity sessions (PAS), these include a 10-minute warm-up, 40 minutes of moderately intense aerobic and strength exercises for the 3 muscular groups, and a 10-minute calm down period. Although the recommendation is to attend these sessions 3 times a week, VS considers acceptable a twice a week attendance during the 6-month period (a total of at least 48 sessions) (14).

Healthy lifestyle workshops address the following topics: consequences of weight gain and motivation to change behavior, planning of a healthy menu, understanding food labels and specific actions to improve dietary intake, and the importance of engaging in daily physical activity, taking into consideration the participant´s possibilities to modify these. If participants attend at least three of the five workshops, VS considers them "active participants".

PARTICIPATION IN THE CORE ACTIVITIES INCLUDED IN THE VIDA SANA PROGRAM

Although core activities include the 2 sessions with a nutritionist, we are not considering them in this study because our inclusion criteria established that the sample only includes those who had anthropometry data at baseline and follow-up.

We determined the participation rate of beneficiaries in any core activity separately 0 (no participation), 1 (participation in any one of the 3 core activities), 2 (participation in any 2 of the 3 core activities), or 3 (full participation). Also, we determined participation rates considering each specific core activity individually, that is, 2 sessions with a psychologist or ≥ 3 lifestyle workshops or ≥ 48 PAS, as well as the rates for the different combinations possible, that is, 2 sessions with psychologist + ≥ 3 behavioral workshops; 2 sessions with psychologist + ≥ 48 PAS; ≥ 3 lifestyle workshops + ≥ 48 PAS. Full compliance refers to 2 individual visits to a psychologist, ≥ 48 PAS, and ≥ 3 lifestyle workshops.

EXPECTED OUTCOMES

The goal of the program is achieved when the beneficiary loses at least 5 % of baseline weight and shows improvement in PF, defined as follows: increases distance in the 6MWT and heart rate post-test is equal to or lower than baseline, or distance is the same at follow-up and the delta heart rate at recovery improves (post-test heart rate – heart rate at recovery).

DATA ANALYSIS

Participants were categorized according to baseline weight as overweight or obese. Using Student's t-test we determined whether there were significant differences between the overweight and obese categories in terms of mean age, height, and 6MWT. A p-value < 0.05 was considered significant. To compare changes in weight and PF between baseline and follow-up we used paired-sample t-tests. We compared the proportion of beneficiaries who achieved only weight loss, who only improved PF, or who achieved both endpoints (the program´s goal), and determined whether there was a significant difference between the proportions achieving each and both outcomes using the test of proportions. We divided the total sample into 2 groups, those who achieved the program´s goal (at least a 5 % weight loss and improvement in PF) and those who did not (either maintaining or increasing weight and not improving PF).

We did 2 logistic regression analyses (adjusted for age and baseline weight). In the first model, we calculated the OR (95 % CI) of attaining the program´s goal according to the level of engagement in 1, 2, or 3 core activities, individually. In the second model we calculated the OR of attaining the program´s goal considering: a) participating in one specific activity individually, and b) participation in different combinations of the core activities as described above *versus* the reference value, that is, no participation. Finally, we determined the linear trend related to engagement, and determined whether it was significant ($p < 0.05$). Data were analyzed with the STATA 14.2 software package.

This study was approved by the Ethics Committee for Human Studies at the Institute of Nutrition and Food Technology (INTA), University of Chile (reference number, P21-2018, on October 24th, 2018).

RESULTS

The sample included 5,179 women 20-44 years of age (mean age, 33 yrs). Table I shows that at baseline 41.5 % (n = 2,148) and 58.5 % (n = 3,031) of the sample were in the overweight and obese categories, respectively. Overweight women performed significantly better in the 6MWT at baseline (Table I).

Changes in weight, BMI, and 6MWT are shown in table II. For both overweight and obese women, weight and BMI decreased significantly, and 6MWT increased significantly (Table II).

However, when we compared the proportion of overweight and obese women who achieved one outcome or both, there were no significant differences. That is, approximately 30 % of both overweight and obese women achieved at least 5 % weight loss, 88 % improved fitness, and 28 % achieved both endpoints (Table III).

Table I. Baseline characteristics of participants in the 2017 Vida Sana program

Characteristics	Total (n = 5,179)		BMI 25-29.99 kg/m² (n = 2,148)		BMI ≥ 30 kg/m² (n = 3,031)	
	Mean	SD	Mean	SD	Mean	SD
Age (years)	33.6	6.7	33.7	6.7	33.6	6.8
Height (m)	1.57	0.06	1.58	0.06	1.57	0.06
Weight (kg)	79.4	13.4	68.6	6.0	87.0	11.9
BMI (kg/m²)	31.9	4.9	27.6	1.4	35.1	4.1
6MWT (m)	526.7	93.5	540.6[a]	94.8	516.9[b]	91.2

6MWT: 6-minute walk test; [a, b]mean values within a row with unlike superscript letters were significantly different (p < 0.05).

Table II. Average changes in weight and 6MWT over 6 months among 2017 Vida Sana participants, according to baseline nutritional status

Characteristics	Baseline		Follow-up		Change*		p value†
	Mean	SD	Mean	SD	Mean	SD	
BMI 25-29.99 kg/m² (n = 2,148)							
Weight (kg)	68.6	6.0	66.8	6.5	-1.8	2.8	< 0.001
BMI (kg/m²)	27.6	1.4	26.8	1.7	-0.8	1.1	< 0.001
6MWT (m)	540.6	94.8	569.5	91.2	28.9	49.6	< 0.001
BMI ≥ 30 kg/m² (n = 3,031)							
Weight (kg)	87.0	11.9	84.2	12.1	-2.7	3.8	< 0.001
BMI (kg/m²)	35.1	4.1	34.0	4.2	-1.1	1.5	< 0.001
6MWT (m)	516.9	91.2	548.3	88.5	31.4	52.2	< 0.001

*6MWT: 6-minute walk test; *Diference between the mean value at follow-up and the mean value at baseline; †Paired sample t-tests.*

Table III. Proportion of overweight and obese women among study participants in the 2017 Vida Sana program who achieved at least 5 % weight loss and improved physical fitness*

Outcomes	Total (n = 5,179)	BMI 25-29.99 kg/m²	BMI ≥ 30 kg/m²	p-value†
Percentage achieving ≥ 5 % weight loss	31.6 %	30.3 %	32.4 %	0. 0998
Percentage improving PF‡	88.2 %	87.1 %	88.9 %	0.0527
Percentage achieving weight loss and improving PF*	28.6 %	27.3 %	29.5 %	0.0823

*PF: physical fitness; *Adjusted for age and baseline BMI; ‡Improvement in PF is defined as an increase in 6MWT or, alternatively, as maintaining walk distance but decreasing baseline heart rate; †Test of proportions.*

In table IV, two groups were considered for the analysis, women who maintained or increased weight at follow-up and did not improve PF (N = 457), and women who achieved at least 5 % weight loss and improved PF (N = 1,480). It is important to point out that at baseline no difference in BMI was observed between those who either did or did not achieve the program´s goal at follow-up, as their BMI was 32.1 (4.8) and 31.7 (5), respectively (p = 0.119) (Table IV).

The first logistic regression model shows that the probability of achieving the program´s goal is 1.55 (CI: 1.20 to 2.03), 2.34 (CI: 1.76 to 3.11) and 3.50 (CI: 2.21 to 5.53) times higher if participants engage in 1, 2 or 3 core activities, respectively. The linear trend analysis showed a significant rise in achieving the desired outcome with increased engagement in the number of core activities (p < 0.001).

The second model shows that when participation in one specific core activity is considered, the highest probability of achieving the program´s goal is engaging in ≥ 48 PAS; OR, 2.36 (CI: 1.48 to 3.77). Participation in ≥ 3 lifestyle workshops was not significant; OR, 1.35 (CI: 0.92 to 1.97).

Table IV. Probability of participants in the 2017 Vida Sana program achieving the program´s goal (≥ 5 % weight loss and improved physical fitness) according to their level of engagement in the recommended activities*

	Participation in core activities	Maintain or increase weight at follow-up + do not improve PF		Achieve at least 5 % weight loss + improve PF		OR	95 % CI
		Freq.	Percent	Freq.	Percent		
Logistic regression model 1	0	151	33.04	297	20.07	reference	
	1	166	36.32	504	34.05	1.55*	(1.20-2.03)
	2	114	24.95	504	34.05	2.34*	(1.76-3.11)
	3	26	5.69	175	11.82	3.50*	(2.21-5.53)
	Total	*457*	*100*	*1,480*	*100*		
Logistic regression model 2	0	151	33.04	297	20.07	reference	
	1.1†	89	19.47	249	16.82	1.44*	(1.05-1.97)
	1.2‡	51	11.16	136	9.19	1.35	(0.92-1.97)
	1.3§	26	5.69	119	8.04	2.36*	(1.48-3.77)
	2.1‖	82	17.94	308	20.81	2,00*	(1.46-2.73)
	2.2¶	20	4.38	91	6.15	2.45*	(1.43-4.09)
	2.3††	12	2.63	105	7.09	4.57*	(2.43-8.58)
	3	26	5.69	175	11.82	3.50*	(2.21-5.53)
	Total	*457*	*100*	*1,480*	*100*		

*PF: physical fitness; *adjusted for age and baseline BMI; †2 sessions with psychologist; ‡≥ 3 lifestyle workshops; §≥ 48 physical activity sessions; ‖: 2 sessions with psychologist + ≥ 3 behavioral workshops; ¶2 sessions with psychologist + ≥ 48 physical activity sessions; ††≥ 3 lifestyle workshops + ≥ 48 physical activity sessions. Linear trend analysis, p < 0.001.*

The second regression model also shows that when beneficiaries participate in 2 of the 3 core activities, the highest probability of achieving the program´s goal entails engaging in both ≥ 48 PAS and ≥ 3 lifestyle workshops: OR, 4.57 (CI: 2.43 to 8.58). This result was higher than participating jointly in 3 core activities, which is probably due to the small N in the first group, contributing to a high upper limit of the CI (17).

Overall, the highest probability to achieve at least 5 % weight loss and improve PF was derived from participating in PAS either alone or together with the other 2 core activities.

As in model 1, the linear trend analysis showed a significant rise in achieving the desired outcomes with increased engagement in the number of core activities ($p < 0.001$).

DISCUSSION

The most important results of this study show that the probability of overweight and obese adult women participants in the VS program achieving 5 % weight loss and improving physical fitness increases significantly with participation rate in the recommended activities, with PAS having a slightly higher influence either individually or jointly with either one of the other core activities or with both. There is a linear trend in the probability of achieving clinically relevant weight loss and improved physical activity as participation rate in the recommended core activities increases.

Overall, 28 % of VS beneficiaries achieved their outcomes within 6 months, with a significantly higher proportion achieving the fitness goal as compared to the weight loss one (88 % *versus* 32 %). This is probably because fitness improvement was defined as maintaining the same distance in the 6MWT with a minimal reduction in heart rate.

By comparison, a 5 % weight loss is more difficult to achieve. Of the total number of beneficiaries who accomplished the program´s goals, 1/5 did not participate in any activity, beyond the initial consultation with an MD and a nutritionist.

A study conducted by Bartfield et al., which included 800 adult participants of the PREMIER study (Lifestyle Interventions for Blood Pressure Control), whose objective was to assess the effects of lifestyle modification interventions, found that, in general, at six months, higher levels of adherence to key behaviors were associated with greater weight loss. That is, the change in behavior frequency over a particular time period may be more predictive of change patterns than the average behavior frequency at any single time point (18).

Compared to overweight women, a higher proportion of obese women achieved the 5 % weight loss and improved fitness goals. This was also observed in a study conducted by Gilis-Januszewska et al. with 175 adult pre-diabetic patients in Poland, whose

objective was to identify factors that predict weight loss. Those with higher BMI and better educational level showed better results, mainly by attending more physical activity sessions (19), a result not found in our study as the average PAS in overweight and obese women were similar, 38.5 and 37, respectively (results not shown). Also, in our study we did not find any difference in weight loss according to age; the change in BMI for women aged 20-32 years and for those in the older group was -0.99 and -0.92, respectively (results not shown). In contrast, Bachar et al. found that higher initial weight and younger age were critical for weight reduction to be successful during the first 6 months (20). Also, a study by Mitchell et al., which analyzed factors predicting clinically significant weight loss in participants of the Take off Pounds Sensibly program, a peer-led program in the United States and Canada, found that older and heavier women were more likely to achieve ≥ 5 % weight loss (21).

Mixed results have been obtained from behavioral interventions for overweight adults conducted in primary care settings. A systematic review including 15 RCTs with behavioral interventions that lasted for at least 1 year analyzed weight loss in 4,539 patients, and showed that, on average, weight change was small and not clinically significant (22). In lifestyle interventions, adherence (defined as complying with program component recommendations) has been found to be a key factor in obtaining positive results, but adherence tends to be low. A recent systematic review concluded that "overall adherence was 60.5 % and that supervised attendance programs, social support, and dietary modification with exercise were important for improving adherence" (23). Leung et al., in their review of factors associated with adherence, found that the most commonly used indicator of adherence was attrition, which is not exactly correct because adherence that refers to the person´s commitment to follow indications (24), which is why in our study we refer to participation rather than adherence since we cannot verify whether subjects either partially or totally followed recommendations (25).

The evidence that overweight and obesity should be tackled with lifestyle changes, mainly diet and physical activity, is convincing. A recent Cochrane Review (26) that included 43 RCTs with 3,476 participants showed that, when compared with no treatment, exercise alone produced modest weight losses while exercise combined with diet resulted in a significantly greater weight reduction.

A retrospective study of 3,156 patients participating in a 12-month lifestyle program showed that mean weight loss at 6, 12, and 24 months was 3.9 %, 3.2 %, and 2.3 %, respectively. At 12 and 24 months, 31 % and 29 % of participants achieved ≥ 5 % weight loss, respectively. These results are similar to those obtained in our study since participants lost on average 2.9 % of their initial weight, while 31.6 % achieved ≥ 5 % weight loss (27).

The fact that 20 % of participants achieved the program goals without engaging in any activity was unexpected, although Heshka et al., in a study that compared weight loss as achieved by overweight and obese adults through a self-help program *versus* Weight Watchers over 2 years, found that after the first year, 38 % of the participants who attended Weight Watchers lost more than 5 % of initial weight, compared to 24 % of those in the self-help group (28).

Desroches et al. analyzed the results reported by 38 studies of adherence to dietary interventions to manage chronic diseases *versus* control/usual care, showing that there were no significant differences in outcomes between participants with the greatest adherence to dietary advice and controls (29).

In the VS program, fitness is determined using the 6MWT. This test was developed to determine the functional capacity of patients with obstructive pulmonary disease. However, it is also being used in healthy adults or individuals with other diseases. In a study to assess the reproducibility of the 6MWT in overweight and obese subjects, the authors concluded that this test is highly reproducible in obese subjects, and can be used as a fitness indicator (30).

It has been reported that overweight and obese individuals have lower values in the 6MWT because of a slower gait speed, which varies from 0.9 to 1.4 m/s in obese individuals as compared to 1.4 m/s in normal-weight adults (31). In our study, obese participants walked much slower than similar individuals studied in Belgium (average 6MWT is 516 m and 591 m, respectively) (32), but faster at follow-up when compared with the results obtained in a small study which included 27 obese Swedish women (548 m and 531 m, respectively). In that study, clinically significant improvement in 6MWT was defined as at least 80 m or 15 % more (33). In our study, average improvement was only around 30 m (5 %) in both overweight and obese participants so, even though the change was statistically significant, it was not clinically significant (34).

The most important strength of this study is the demonstration that the effectiveness of a nation-wide program is associated directly with increased participation, and that overall there is no clinically significant improvement in physical fitness.

LIMITATIONS

An important limitation is the fact that we were unable to verify whether the methods used to determine weight, height, and physical fitness of participants were standardized in each health center, although the percentage of plausible data is within acceptable limits.

There is an urgent need to modify the criterion to define fitness improvement, based on evidence. In doing so, effectiveness will decline, which should prompt policy makers to consider readjusting the activities in the program in order to increase its effect. Also, it is important to determine how was it possible that 20 % of individuals reached the program´s goals with no participation.

CONCLUSIONS

The results of this program could be relevant to other countries trying to develop programs to treat obesity. Determining participation rate is important and should be considered when planning and evaluating health programs. This may lead to program modifications where components that are not as successful as others could be eliminated, and also to streamline program costs.

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