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RESEARCH ARTICLE

ANALYSIS OF THE RESULTS OBTAINED AFTER A MOTIVATIONAL INTERVENTION WITH OBESE OR OVERWEIGHT CHILDREN AND THEIR FAMILIES

[1]Nuria Rosich Domenech, [2]Josefa M Panisello Royo, [3]Eurald Castells Panisello, [3]Joseph Allins, [4]M Loreto Tarraga Marcos and *,[5]Pedro J. Tárraga López

[1]Nutritionist of Igualada, Barcelona, Spain
[2]Internist of Igualada, Barcelona, Spain
[3]Psychologist of Fufosa, Spain
[4]Geriatrics Nurse, Albacete, Spain
[5]Professor of Medicine, University of Castillala Mancha, Spain

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ABSTRACT

Objective: To evaluate the evolution of anthropometric parameters and the quality of the diet of overweight or obese children and their families.

Patients and Method: Eleven children (10 girls and 1 child) aged 6 to 12 years, all overweight or obese, were included in the program. They were selected by the head of the Basic Health area of the population. Both the patients and their parents received all the program information at a meeting, and agreed to participate voluntarily in the meeting. The parents also carry out a previous interview where information about the family context, the health history and the stressful life events, if any, are collected in the child's life. The program is grouped in two simultaneous and separate spaces, one for children and one for parents and / or grandparents or relatives. The measurements made to the children at the beginning and end of the program are: anthropometric measures: weight, height, BMI. Psychometric averages: anxiety with the CMAS-R test 3) and depression with the CDI test. Assessment of body perception and satisfaction with his body, through closed questions (with scales ranging from 0 to 10. The sample of parents is evaluated, at the beginning and end of the course, with the following instruments: Anthropometric measures: weight, height and BMI. KIDMED questionnaire that assesses the quality of the diet in relation to the Mediterranean diet of both adults and their respective children (self-administered). STAI anxiety questionnaire for the assessment of anxiety trait and anxiety status. The data obtained from anthropometric assessments and self-administered questionnaires were entered into a computerized database using the SPSS (Statistical Package for Social Sciences) version 20.0. Since our sample of subjects is small (N of children = 11, N parents = 11) we have opted to analyze the data with nonparametric tests.

Results: In the 11 children BMI decreased from a mean (SD) of 26.34 (3.18) to 25.13 (3.6) ($p < 0.001$) and from 2.20 (0.69) to 1.97 (0.91) ($p < 0.001$. At the beginning of the course the average score on the KIDMED was 7.33 (DT = 0.87) (needs to improve) while at the beginning of the course the average score on the KIDMED was 7.33 The mean score was 9.78 (SD = 0.32) (the optimal diet), and the diet of the children who participated in the program improved at the end of the program, and the differences were statistically significant ($p = 0.006$). In the relatives, the weight decreased significantly in 7 cases, 2 was not modified and others could not be calculated because they did not come to the last consultation. They improved their state of anxiety and trait status. They also increased their adherence to Mediterranean diet.

Conclusions: The application of the "Families in Motion" program led to a decrease in BMI and an increase in the quality of the Mediterranean diet.

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INTRODUCTION

The important global increase in obesity is one of the most difficult challenges in public health facing society today, a situation that not only affects countries with higher incomes, but is also increasing in countries with middle incomes and Low1. According to the World Health Organization (WHO), between 1980 and 2014, the global prevalence of obesity (body mass index [BMI] + 30) has almost doubled. In the world, overweight and obesity are associated with more deaths than underweight. Obesity is a chronic disease that usually begins in childhood and adolescence. According to the WHO, childhood obesity is currently one of the most serious global public health problems of the 21st century and is progressively affecting many low- and middle-income countries, especially in urban settings (WHO, 2014; Cameron *et al*., 2012; Whitlock *et al*., 2009; Grimble, 2010). Overweight and childhood obesity are

Corresponding author: Pedro J. Tárraga López,
Professor of Medicine, University of Castillala Mancha, Spain

due to multiple causes, where genetic, hormonal, lifestyle and environmental influences come together, with lifestyles having the greatest relationship. Often the tendency to overweight begins in childhood, due to unhealthy behavior patterns and lifestyles (Cameron *et al*., 2012), which develop within an "obesogenic environment." The treatment of childhood obesity needs to combine a non-deficient and balanced diet that allows adequate growth, increased physical activity and the modification of attitudes and eating behaviors of both the child and his family environment4,5-10, without neglecting the Psychological aspects such as low self-esteem, anxiety or depression, or harassment that overweight children often suffer, which may hamper their social integration and emotional development in the short and long term 4,11,12. "Families on the Move" 13-17 is a multidisciplinary program aimed at overweight and / or obese children aged 7-12 years and their family environment, structured in 11 group sessions (one per week) of 90 minutes duration, which Promotes a normocaloric and balanced diet. It focuses on the child's overall health, not just on weight and nutrition. Also involved are adults with obesity or overweight problems that influence the child, especially parents who live with them and older siblings. It encompasses the social, physical and emotional areas and has been developed on the basis of: a) the consensus dossier of 3 Spanish medical societies: the Spanish Pediatric Association, the Spanish Society of Community Nutrition and the Spanish Society for the Study of Obesity; (B) the guidelines of the Society for Nutrition Education's Weight Realities Division for obesity prevention programs for children "promoting a healthy weight"; (C) the recommendations of the New England Medical Center Committee (Boston, Massachusetts, USA) for the development and treatment of childhood obesity; D) the objectives set by the NAOS strategy (Nutrition, Physical Activity and Prevention of Obesity) of the Spanish Ministry of Health for the prevention of childhood obesity 5, and e) our own experience 4.

The aim of this study was to evaluate the efficacy of the "Families in Motion" program through the evaluation of a number of anthropometric, dietary and psychological parameters, before and after its application, in 11 overweight and / or obese children. The relatives who wanted to participate.

MATERIALS AND METHODS

Subjects

The group included 11 children (10 girls and 1 child) between 6 and 12 years old, all of them overweight or obese. Both the patients and their parents received all the program information at a meeting, and agreed to participate voluntarily in the meeting. The parents also carry out a previous interview where information about the family context, the health history and the stressful life events, if any, are collected in the child's life. The program is grouped in two simultaneous and separate spaces, one for children and one for adults (parents and / or grandparents or older siblings).

Methodology

The program, aimed at overweight or obese children of school age and their family environment, focuses on the emotional, lifestyle and nutritional aspects that are at the root of childhood obesity. A balanced and age-appropriate diet pursues the normalization of the body mass index (BMI) in the medium or long term, avoiding rapid decreases in weight and taking into account that the child is growing and that a balanced diet will contribute to The progressive normalization of BMI. The sessions address and work on issues related to food, emotionality and lifestyles: healthy eating, misleading advertising, self-control, body image, communication, conflict resolution, assertiveness, personal rights, self-esteem, relaxation, activity and physical inactivity Hours of television, computer games and internet). It uses cognitive-behavioral and affective techniques. It is of a group character (5 and 6 children per group) and develops in two simultaneous and separate spaces, one for the children and another for the relatives (one or two for each child, preferably parents or grandparents or siblings with influence on children), Where they analyze and express concepts and emotions related to overweight, obesity and its consequences in the short and long term. It is developed in sessions of 90 min of duration, one per week, during 11 weeks. The program has teaching materials for children, the family and the educator13-17.

Measuring instruments

The measurements made to the children at the beginning and end of the program are:

- Anthropometric measurements: weight, height, BMI (Table 1)
- Psychometric means: anxiety with the CMAS-R test (Annex 3) and depression with the CDI test 18-22.
- Assessment of body perception and satisfaction with his body, through closed questions (with scales ranging from 0 to 10)

The sample of parents is evaluated, at the beginning and end of the course, with the following instruments:

- Anthropometric measures: weight, height and BMI
- KIDMED questionnaire assessing the quality of the diet in relation to the Mediterranean diet of both adults and their respective children (self-administered).
- STAI anxiety questionnaire for the assessment of anxiety trait and anxiety state (self-administered).

Anthropometric measures are also collected at 3 months and a year after the end of the program. It is therefore a longitudinal study with repeated measures. The data obtained from anthropometric assessments and self-administered questionnaires were entered into a computerized database using the SPSS (Statistical Package for Social Sciences) version 20.0. Since our sample of subjects is small (N of children = 11, N parents = 11) we have opted to analyze the data with non-parametric tests, specifically the Wilcoxon test for comparison of related samples.

RESULTS

Children

Table 2 shows the values of the anthropometric variables at the beginning and end of the program. The BMI was calculated according to the formula weight (in kg) divided by the square of the height (in m). The mean (SD) of the BMI of the total sample (n = 11) at the end of the program was lower than the mean of the beginning: 26.34 (3.10) vs 25.13 (3.5)

respectively. In fact, 100% of the sample, ie the eleven children, decrease their BMI at the end of the course. These differences between the BMI at the beginning and at the end of the program are also statistically significant ($p < 0.05$) as shown by the Wilcoxon test.

Nutritional status according to ED of body mass index

Obesity is considered to exist when BMI values are greater than +2 standard deviations (SD) from mean values; Overweight when they are between +1 and +2 DE and normal weight when they were between +1 and -1 DE. Following these cut-off points we observed that 6 of the children who participated in the program decreased their SD at the end of the course, 2 of them increase their score and one of them is maintained. The differences between ED at the beginning and at the end of the program are not statistically significant if we can say that they show a significant downward trend ($p = 0.093$). Overall, at the beginning of the program, none of the children were classified as normal weight where as at the end of the course one of them (which is 11%) meets normality parameters. The percentage of children with obesity decreases at the end of the program (from 56% to 33%) and some of these children increase the percentage of overweight from 44% to 56%. It should be noted that the duration of the study is only 11 weeks and that the goal is not a drastic reduction of weight but a halt in its increase, therefore, some of the children although follow a positive trend in terms of weight improvement, They do not reach the normal weight cut points yet.

Quality of diet

The mothers or fathers of the patients answered the quality questionnaire of the Mediterranean diet KIDMED, which includes 16 items and allows to calculate the Kidmed index (0-12 points). According to the obtained score, three grades of quality of the diet are obtained: optimal (score ≥8), with need to improve the dietary pattern (score between 4 and 7), and very low quality diet (score ≤3) At the beginning of the course the average score in the KIDMED was 7.33 (DT = 0.87) (needs improvement) while at the end of the course the average score was 9.78 (DT = 0.32) (optimal diet). Thus, the diet of the children who participated in the program improves at the end of the program (Table 3). The differences are also statistically significant ($p = 0.006$). In percentages, we can observe that at the beginning of the program the majority of the children, 67% (n = 6), presented scores in the KIDMED equivalent to a diet in need of improvement (mean nutritional value) An optimal diet. There is an increase in the percentages of children consuming fruits, vegetables, fish, pasta or rice and dairy products. Likewise, the percentage of children who did not take breakfast increased from 44.4% to 0%, as did the consumption of sweets or the use of industrial bakery products, which rose from 22.2% to 0%.

Psychological Variable Results

Anxiety was assessed with the CMAS-R (Manifesta Anxiety Anxiety Scale-Revised, Reynolds and Richmon). It is a self-administered questionnaire designed to determine the level and nature of anxiety in children and adolescents between 6 and 19 years of age. It consists of 37 items and the sum of the positive responses determines the total anxiety score, as well as the evaluation of four subscales: physiological anxiety, restlessness / hypersensitivity, social concerns / concentration and lying. On the CMAS-R Total Anxiety Scale. As we can observe 6 subjects decrease their score in this scale at the end of the course, one of them stays at the same percentile and only one of the children increased in this scale. A subject was discarded because he had not correctly answered the questionnaire (N = 10) We believe it is important to note that at the beginning of the study the percentiles range from a maximum of 95 to a minimum of 16. Two children have high anxiety percentiles (p95, p72). At the end of the course the case with the highest percentile is p65 and the lowest percentile 1. We observed important decreases at the qualitative level although the statistical tests performed have not shown statistically significant differences. Overall, 75% of children have a decrease in their anxiety scores. Only one case increases their anxiety and the other decreases. The ICD, a child depression questionnaire, is a self-administered instrument aimed at the population between 7 and 17 years old. Each item responds to a Likert scale, where 0 indicates "normality", 1 indicates "certain intensity" and 2 indicates the "unequivocal presence" of a depressive symptom. The higher the score, so is the intensity of depressive symptomatology. 5 of the subjects in the sample had lower percentiles at the end of the program (55.6%), while 2 of them increased (22.2%). Two children are practically the same (95 to 97 and 90 to 92 respectively). However, no statistically significant differences were found between the scores obtained at the beginning and end of the course for this variable. In addition to the psychological tests, the children also complete some tables where they rate the perception they have of their body parts one by one, as well as the general assessment they have of their physical appearance and the valuation that they believe their friends would give them. All ratings are scored from 0 to 10 (higher rating means higher rating). The results show that the mean values of the body parts at the end ($\mu = 7.344$; DT = 2.78) are higher than the mean scores at the start of the course ($\mu = 6,978$; That is, at the end of the course they seem to value their body more positively. The differences, however, are not statistically significant.

Table 1. Weight, height and body mass index (BMI) of the sample of children, for both sexes, at the start of the program (n = 11)

	Niñas/os (n=11)			
	Mínimo	Máximo	Media	DE
Age	7,41	12,49	9,72	1,46
weight (Kg)	38,200	79,500	53,77	12,84
Height (m)	1,27	1,56	1,42	0,10
BMI	23,16	32,66	26,34	3,11
BMI en DE	1,20	3,42	2,20	0,70

Table 2. Summary of BMI and BMI scores in SD of the sample of children at the beginning and end of the program

n	BMI		BMI en DE	
	Initial	End	Initial	End
Media	26,34	25,13	2,20	1,97
DT	3,10	3,5	0,69	0,81

Table 3. Average score of the Kidmed index at the beginning and end of the course

	N	Media	Desviación típ.	Error típ. de la media
Índice KIDMED initial	11	7,33	,866	,29
Índice KIDMED End	11	9,78	,972	,32

Table 4. Descriptive statistics of the variables height, weight and BMI at the beginning of the course for the sample of parents

	N	Mínimo	Máximo	Media	Desv. típ.
Eight	11	1,51	1,71	1,59	,063
Weight	11	56,400	129,000	83,93	23,29
BMI	11	24,43	51,67	34,35	9,75

Table 5. Average KIDMED index scores at the beginning and end of the program for the adult sample

	N	Mínimo	Máximo	Media	Desv. típ.
Índice KIDMED initial	11	6	10	7,90	1,370
Índice KIDMED End	11	8	12	10,11	1,269

Table 6. Descriptive statistics of the variables anxiety state and trait anxiety at the beginning and end of the program and comparison of means according to Wilcoxon test

	Mínimo	Máximo	Media	Desv. típ.	Sig. Wilcoxon
State Anxiety Initial	15	70	46,11	20,12	P=0.352
State Anxiety End	4	75	37,44	26,87	
Anxiety Initialrasge	5	80	45,56	31,17	P=0.086
Anxietyrasge End	1	85	27,78	29,66	

The average score at the end of the course to the question: "In general, with what note do you value your physical appearance", is 8.33 (SD = 1.80), compared to an average of 7 (DT = 2.06) points At the beginning of the program, with which we can affirm that the children improved in the general assessment of their physical appearance. The differences, in this case, are statistically significant (p = 0.040, p <0.05). Again the children answered the question "In general, with what note do you think your friends value your physical appearance". The mean score at the end of the course (μ = 7.11, SD = 3.22) was slightly higher than the mean score obtained at baseline (μ = 6.61, SD = 3.16). In this case the differences were not statistically significant

Adults

Anthropometric characteristics

Of the 11 adults, 7 decrease their weight at the end of the course and 2 increase. Two adults did not come to the last session so we could not collect their pesos at the end. The mean weight loss was about 3.6 kg (DT = 5.95), with a subject that lost 13,700 kg. The mean weight at baseline was 83.93 (SD = 23.29) while the mean weight at the end was 76.99 kg (SD = 10.42). This difference between the mean weight at the beginning and at the end of the program, however is not statistically significant, but shows a trend (p = 0.86) towards statistical significance. Of the total of 11 adults we only have BMI data at the beginning and at the end of 7 of them (some of us have weight but not size so we cannot calculate the BMI). They all decrease their BMI at the end of the study. The mean BMI for this sample at the beginning of the program was 34.36 (SD = 9.75), while at the end of the course it was 30.25 (SD = 8.43). The differences were statistically significant (p = 0.018, p <0.05).

Quality of diet

As for the results of the quality questionnaire of the Mediterranean diet, KIDMED, the average score of the parents at the beginning of the course was 7.90 (DT = 1.37), diet of average nutritional value, in need of improvement. At the end of the course the mean score was 10.11 points (SD = 1.26) (see Table 4). There is therefore an improvement in the quality of the parents' diet after the program. These differences were statistically significant (p = 0.007). The frequencies of the KIDMED by item before and after the program in which we can observe that there is an improvement in all of them, except in the consumption of legume that is maintained. We emphasize that at the end of the program, all adults will have breakfast in the morning. There is also an increase in consumption of fruits and pasta and rice and cereals. At the start of the program, 40% of adults followed a diet of medium nutritional value (Kidmed scores of 4 to 7), while at the end of the program 100% of adults follow an optimal diet (with scores above 8 In the Kidmed index). This result coincides with that found for the sample of children.

Psychometric variables

The scores (in percentiles) in both STAI scales, state anxiety and trait anxiety, decrease at the end of the program as shown in the bar chart (25) although these differences are not statistically significant. In the case of trait anxiety, the statistical test does show results with a significant trend (see Table 5)

DISCUSSION

"Families in movement" is a behavioral re-education program aimed at overweight or obese children, whose objective is to modify the lifestyles, eating habits and psychological conditions of the child and his / her family environment that contribute to a weight gain pathological and to the development of obesity. It helps the participants to introduce changes in their eating behavior, their physical activity and their emotional area in order to achieve a progressive decrease in BMI and lay the foundations that contribute to prevent obesity in adulthood. Promotes a normocaloric and balanced diet, and does not pursue rapid decreases. Of the IMC, but these are raised in the medium and long term counting on the fact. That the child is in a time of growth and that a balanced diet. Will contribute to the progressive normalization of your IMC13. The data obtained (n = 11) show that the follow-up of the program has a positive impact on children and their families, facilitating weight loss and modifying eating habits as well as the emotional aspects that contribute to the development of obesity. BMI improves and the quality of the Mediterranean diet too, increasing consumption of fruits, vegetables, dairy, fish, legumes and rice. Another factor, in our opinion determining, is that it decreases the number of children who did not eat breakfast at home. It is known that not eating breakfast is a factor that predisposes to obesity since it causes an increase in food intake in the middle of the morning or at mealtime or eating highly energetic foods. In addition, prolonging nighttime fasting throughout the morning causes blood glucose values to remain low and this can be a predictor of school performance.

We also think it is important to comment that, although it is interesting to take measures of psychological distress both

parents and children, the psychological variables studied serve as a guide in the intervention process but it can hardly be said that all changes (both positive and negative) Have a causal relationship with the program, since there are many other factors, other than weight, that may be influencing anxiety and depression (end-of-course notes, interpersonal relationships, economic factors, family or work problems ...) Intervention of only three months is insufficient for significant and lasting changes in certain psychological features. The small size of our sample gives us the possibility of qualitatively analyzing some representative cases of the group. In particular we want to consider the case of a family with four children, two of whom were unable to attend the sessions in a classroom, given their short age and difficulty in understanding the exercises. Parents actively collaborated in all sessions by applying the recommended guidelines equally for all family members and showed that they had internalized and implemented the program's objectives. The two children who participated and both parents, who suffered from morbid obesity, managed to improve all the parameters analyzed, and after a year we could say that they have modified their eating habits and lifestyle, as well as the relationships between them and their Environment, as manifested by the primary care professionals that led to the program, also preventing possible problems of obesity in the minor children.

One of the children in the group, however, has not followed the expected evolution, despite having attended all the sessions along with their main caretakers, their grandparents. Your BMI has been increasing in follow-up, despite stating that it follows an optimal diet. Psychological distress scores have also worsened at the end of the program. It comes from a destructured family context, of separated parents with whom it does not live, except on occasional days. The mother, who attended only the last session, said she had noticed positive changes in her daughter but continued to reward her with poorly balanced foods and was not too keen to know what dietary advice to follow. This shows the limitations that can sometimes be found in the implementation of the program, since there are vital circumstances that can condition the adhesion or negatively influence the intervention. Even so, it is possible to emphasize the effort of these grandparents, taking into account their cultural limitations, to attend the sessions and to correct many of their culinary customs. The results reflect only what happens after the end of the program and a longer follow-up, so the program is not interrupted. At the end of the 11 sessions, but is extended with group follow-up visits, first monthly, then quarterly, for 2 more years, and then annual up to 5 years after the end of treatment. We began to have data of a year of evolution in a reduced number. Of children, which will be communicated when the number is higher. For subsequent editions of the program we have seen a thorough selection process with a complete motivational interview in order to create homogeneous groups that allow equal progress to all participants.

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