

Multidisciplinary care management has a positive effect on paediatric obesity and social and individual factors are associated with better outcomes

Caroline Carriere ^{a,b,c}, Cassandre Cabaussel ^{c,d}; Clément Bader ^a, Pascale Barberger-Gateau ^{a,b}, Pascal Barat ^{a,c,d}, Hélène Thibault ^{a,b,c,d}

^a Université Bordeaux, 146 rue Léo Saignat, F-33000 Bordeaux, France ^b INSERM, ISPED, Centre INSERM U897-Epidémiologie-Biostatistique, 146 rue Léo Saignat, F-33000 Bordeaux, France ^c RePPOP of Aquitaine, 2 rue de l'église St Augustin, Bordeaux F-33000, France ^d CHU de Bordeaux, Unité d'endocrinologie et de diabétologie pédiatrique, Hôpital des Enfants, 33076 Bordeaux, France **CONTACTS:** Dr Hélène Thibault : helene.thibault@orange.fr Pr Pascal BARAT : pascal.barat@chu-bordeaux.fr

INTRODUCTION

In southwest France, a regional health network for the prevention and care management of paediatric overweight and obesity - **RePPOP Aquitaine** - was set up in 2006. RePPOP offers **individualised and multidisciplinary healthcare management** for a maximum duration of **two years** based on the severity of the initial weight problem and the overall situation of the child and his or her family. The care management is initiated by the attending physician, generally the family's general practitioner or paediatrician, who decides if any referrals are needed to dieticians, psychologists or physical activity professionals, with the fees for these services being paid by RePPOP. Patients could also participate in group therapy sessions, appropriate physical activity group sessions or spend short stays in a specific in-patient unit for less than two months.

OBJECTIVES

- To assess the impact of the paediatric obesity care management proposed by RePPOP Aquitaine, with regard to the change in the child's degree of obesity between the initiation of treatment and the end of care management
- To investigate factors associated with a better outcome at the end of care management.

POPULATION

This study was conducted on the first 982 overweight or obese children and adolescents up to the age of 18, who started the RePPOP care management programme from September 2006 to May 2010 and had at least one medical follow-up appointment. Overweight and obesity were defined according to the French body mass index (BMI) references ¹.

METHODS

Data collected

The data collected from the baseline consultation and from the last available medical consultation were: **anthropometric data, academic difficulties, degree of obesity, eating habits and sedentary and physically activities**. These data were collected thanks to a digital medical file filled in by the referring physician after each consultation. The medical file was filled in by the same referring physician at all stages of the care management.

Moreover, the length of medical follow up was defined as the time that had elapsed, in months, between the baseline and the last available medical consultations.

Changes in corpulence assessment

Changes in corpulence were assessed using the BMI Z score¹, in order to take into account variations in BMI for age and sex. Changes in the BMI Z score between the baseline and the last available medical consultation were calculated for each child and were assessed using two criteria:

- **Absolute Δ BMI Z score** = BMI Z score at the last consultation - BMI Z score at baseline
- **Relative Δ BMI Z score** = Absolute Δ BMI Z score / BMI Z score at baseline

The **relative Δ BMI Z score** takes into account the initial weight at baseline and provides an assessment of the outcomes of care management by neutralising the effect of initial weight on the evolution of body size.

Statistical analysis

Associations between initial characteristics and outcomes at the end of care management were assessed using the Student t test and chi-square test, ANOVA and Pearson's correlation coefficient at the univariate stage. The variables that were significant at the univariate stage at $p=0.20$, and with less than 15% of missing data, were then entered into a multivariate linear regression analysis using the same dependent variables. Multivariate analyses were used to examine the independent interaction between the initial characteristics of the children and outcomes at the end of care management. The two main analyses, one with outcomes equal to **absolute Δ BMI Z score** and one with outcomes equal to **relative Δ BMI Z score**, were performed as two independent analyses. For each of the variables not considered in the main selection procedure, owing to more than 15% of missing data, a complementary multivariate analysis was conducted on a sub-group of children without missing data in order to confirm their association with outcomes. A p value of <0.05 was considered as statistically significant. Statistical analyses were performed using the SAS version 9.3 software (SAS Institute Inc., Cary, North Carolina, USA).

RESULTS

Multidisciplinary care management has positive effect on paediatric obesity

At the end of care management, **75.5% of subjects had decreased their BMI Z score**. A decrease of the BMI Z score was observed:

the **absolute Δ BMI Z score** was -0.36 ± 0.60 Kg/m² and the **relative Δ BMI Z score** was $-11 \pm 18\%$.

Social and individual factors associated with better outcomes...

... according to Absolute Δ BMI Z score

At the multivariate stage, associations with successful outcomes at the end of care management according to the **absolute Δ BMI Z score** were: **age at baseline** between five and 15 years, **practicing sport in club and length of follow up** of longer than 10 months.

Table 1: Characteristics associated with better outcomes at end of care management according to **Absolute Δ BMI Z score** - Multiple linear regression - (N=975).

Variables	OR	95% IC	P
Low parental socio economic status	0.03	-0.055 0.122	0.453
Age at baseline (between 5 and 15 y.old)	-0.011	-0.023 0.001	0.050
Length of follow-up in RePPOP (more than 10 months)	-0.008	-0.012 -0.003	0.0004
Sport in club (yes)	-0.14	-0.218 -0.068	0.0002

... according to Absolute Δ BMI Z score

At the multivariate stage, associations with better outcomes according to **relative Δ BMI Z score** were: **age at baseline** between five and 15 years, practicing **sport in club**, **length of follow up** of longer than 10 months, having **no academic difficulties** and **having no overweight or obese parents**.

Table 2: Characteristics associated with better outcomes at end of care management according to **Relative Δ BMI Z score** - Multiple linear regression - (N=850).

Variables	OR	95% IC	P
Academic difficulties (yes)	0.035	0.005 0.065	0.024
Low parental socio economic status	0.019	-0.01 0.048	0.21
Age at baseline (between 5 and 15 y.old)	-0.008	-0.012 -0.004	0.0001
Length of follow-up in RePPOP (more than 10 months)	-0.003	-0.004 -0.001	0.0003
Overweight or obese parents	0.018	0.001 0.034	0.032
Sport in club (yes)	-0.038	-0.064 -0.013	0.0031

A complementary multivariate models among sub-groups of children without missing data showed that **age at onset of overweight** was significantly associated with better outcomes according to the **relative Δ BMI Z score** ($p=0.02$), while age at adiposity rebound tended to be associated with better outcomes, but not significantly ($p=0.06$).

Conclusion

The multidisciplinary care management provided by RePPOP Aquitaine resulted in a significant positive effect on paediatric obesity. This study confirms that several social and individual factors affect the efficiency of obesity care management and also highlights the importance of organising care within the family and the health professional community.

References

1. Rolland-Cachera MF, Cole TJ, Sempé M, Tichet J, Rossignol C, Charraud A. Body Mass Index variations: centiles from birth to 87 years. *Eur J Clin Nutr* 1991; 45:13-21

Conflicts of interest

The authors declare that they have no conflict of interest.

Publication in progress

Publication of these data in progress in *Acta Paediatrica - Acta paediatr*. 2016 Aug 26. DOI 10.1111/apa.13560.

