

The prevalence of underweight and obesity in CHD. Response to body mass index and age are associated with ventricular end-diastolic pressure in adults with a Fontan circulation

Letter to the Editor

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Abstract

Introduction: The aim of the study is to determine the impact of obesity in children with CHD which is severe enough to require invasive catheterisation. **Methodology:** This is a retrospective study in a cardiac catheterisation laboratory of a large paediatric hospital. The material consisted of 378 children from 2 to 19 years old who underwent heart catheterisation in the years 2011–2019. Their anthropometric data were collected, and the body mass index was calculated. The BMI centile was then calculated according to the Centers for Diseases Control (CDC). They were classified as overweight (85–95th centile), obese (> 95th centile), normal weight (5th–85 centile), and underweight (< 5th centile). **Results:** 18.7% of children were underweight, 54.76% were normal weight, 11.64% were overweight, and 14.81% were obese. Overall, 26.45% of the children were overweight. Boys were more likely to have increased body weight than girls, but the difference was not statistically significant. The percentage of increased weight was similar in children with acyanotic CHD as well as heart disease from other causes. On the contrary, children with cyanotic heart disease were more likely to be younger and have a higher percentage of underweight children. **Conclusions:** The rates of obesity and overweight in children with CHD depend on the sex, age, and cardiopathy type. In addition, they agree with the findings that have been published in international series studies for children with CHD.

Dear Sirs

I read with great interest the report from Howell, Anderson, Allegria et al about the correlation of age, body mass index, and diastolic pressures.¹

The exact prevalence and body habitus of CHD in the general population presupposes the existence of sufficient registries. In 2000, the incidence of CHD in adults was 4.09/1000 and 9% were severe. In addition, the average age of patients increased from 11 years in 1985 to 17 years in 2000.² Lower body weight was observed in symptomatic patients with greater severity of heart disease.^{3,4} Men with severe CHD appear to have higher rates of low body mass index.⁵ Overweight and obese rates, however, increase with age.⁶ Younger patients with Fontan's circulation had a lower body mass index than the general population, and this trend was reversed in those over 20 years of age.⁷

We conducted a retrospective study in our cardiac catheterisation laboratory during the years 2011–2019. The material consisted of 378 children from 2 to 19 years old who underwent heart catheterisation for acyanotic, cyanotic CHD, or other causes. Their anthropometric data were collected, and the body mass index was calculated.

The BMI centile was then calculated according to the Centers for Diseases Control definition. They were classified as overweight (85–95th centile), obese (> 95th centile), normal weight (5th–85 centile), and underweight (<5th centile).

18.7% of children were underweight, 54.76% were normal weight, 11.64% were overweight, and 14.81% were obese. Overall, 26.45% of the children were overweight. Boys were more likely to have increased body weight than girls, but the difference was not statistically significant. The percentage of increased weight was similar in children with acyanotic CHD as well as heart disease from other causes. However, children with cyanotic heart disease were more likely to be underweight 27.7% compared to 16.6% with acyanotic heart disease and 13.3% of children with other heart disease. Accordingly, children with cyanotic heart diseases were less likely to have increased body weight 15.7% than children who had cyanotic heart diseases 29.8% or other forms of heart disease 26.7% (Table 1).

On the contrary, children with cyanotic heart disease were more likely to be younger and have a higher percentage of underweight. The difference of body weight between the types of catheterisation was small but statistically significant. Children of preschool age were thinner, while adolescents were the heaviest. The difference was statistically significant.

Table 1. Anthropometric data

	Acyanotic cardiopathy			Cyanotic cardiopathy			Other			p
	n	x ± SD	95% CI for mean	n	x ± SD	95% CI for mean	n	x ± SD	95% CI for mean	
Age	265	8.46 ± 4.06	7.97, 8.96	83	6.51 ± 3.81	5.67, 7.34	30	9.00 ± 4.73	7.23, 10.77	<0.005
Weight (kg)	265	33.44 ± 17.32	31.35, 35.54	83	22.33 ± 12.53	19.60, 25.07	30	30.14 ± 15.49	24.36, 35.93	<0.005
Height (cm)	265	131.91 ± 25.21	128.86, 134.96	83	114.63 ± 25.08	109.15, 120.1	30	126.73 ± 26.39	116.88, 136.59	<0.005
BMI	265	18.06 ± 4.68	17.49, 18.63	83	15.80 ± 3.1	15.13, 16.48	30	17.18 ± 3.98	15.70, 18.66	<0.005
(BMI) (%) centile	265	50.6 ± 36.92	46.13, 55.06	83	37.75 ± 35.2	30.06, 45.43	30	42.97 ± 37.06	29.13, 56.8	0.017

As the incidence of obesity in adults with CHD appears similar to that of the general population, it is important to clarify exactly when obesity begins. For example, it is important to investigate whether the foundations begin with poor dietary practices or unnecessary exercise restriction in childhood, or if they occur several years later, after the interventions are over.

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Conflicts of interest. There are no conflicts of interest.

Ethical standards. The study was approved by the Hospital Ethics Committee.

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