

# Childhood Obesity in the Caribbean

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## ABSTRACT

**Objective:** To determine the prevalence of overweight among school children in Bonaire, an island in the Caribbean, and to obtain clues for prevention of overweight.

**Methods:** In a cross-sectional school-based study, weight and height were measured in all 4–16-year old children in Bonaire ( $n = 2148$ ). Body mass index was categorized as defined by the International Obesity Task Force (IOTF). The children were administered a questionnaire pertaining to lifestyle and nutrition.

**Results:** The prevalence of overweight, including obesity, in boys is 24.3%, and 31.9% in girls; obesity is 9.9% and 13.7%, respectively. Approximately half of the children have an unhealthy food pattern. Significantly less overweight (49%) and obese children (45%) are physically active for > 1 hour/day compared to normal weight children (56%).

**Conclusion:** The prevalence of overweight and obesity in children in Bonaire is high. Prevention of overweight should focus on stimulating healthy eating habits and more physical activity.

**Keywords:** Bonaire, Caribbean, child, obesity

# La Obesidad Infantil en el Caribe

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## RESUMEN

**Objetivo:** El objetivo de este estudio fue determinar la prevalencia de sobrepeso entre los niños escolares en Bonaire – una isla en el Caribe – y obtener ideas para la prevención del sobrepeso.

**Métodos:** Se realizó un estudio transversal en una escuela, en el cual se midió el peso y la altura de todos los niños de 4–16 años de edad en Bonaire, ( $n = 2148$ ). El índice de masa corporal se categorizó de acuerdo con las definiciones dadas por la llamada International Obesity Task Force. A los niños se les aplicó una encuesta sobre el estilo de vida y la nutrición.

**Resultados:** La prevalencia de sobrepeso – incluyendo la obesidad – en los niños fue 24.3%, y en las niñas 31.9%, en tanto que la prevalencia de la obesidad fue 9.9% y 13.7% respectivamente. Aproximadamente la mitad de los niños tenía un patrón alimentario poco saludable. Un número significativo de niños de menos sobrepeso (49%) y menos obesos (45%) era físicamente activo durante > 1 hora/día, en comparación con los niños de peso normal (56%).

**Conclusión:** La prevalencia de sobrepeso y la obesidad en los niños de Bonaire es alta. La prevención de sobrepeso debe centrarse en estimular hábitos saludables de alimentación y mayor actividad física.

**Palabras claves:** Bonaire, Caribeño, niño, obesidad

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## INTRODUCTION

Worldwide, the prevalence and severity of overweight and obesity among children is increasing (1, 2). Obesity leads to chronic illnesses like type 2 diabetes, hypertension and cardiovascular disease (3–5). The Governor of Bonaire requested a determination of the prevalence of overweight and obesity among Bonarian children. A high response rate was expected in this study. It was also expected that there would

be a low influence of fast-food chains on the island. Fast food is often associated with overweight and obesity (6).

The aim of this study was to determine the prevalence of overweight and obesity in school children in Bonaire and to compare the outcome with studies from other islands in the Caribbean. A second aim of the study was to obtain clues for prevention of overweight.

## SUBJECTS AND METHODS

A cross-sectional study was carried out among all school children in Bonaire, an island in the Caribbean, from March – April 2008. All children attending public school were asked to participate in the study. Parental permission for participation in the study was given by means of passive informed consent.

Measurement of weight and height was performed by two trained research assistants. Weight was measured to the nearest 0.1 kg with a calibrated digital scale (Seca® type 80) without shoes in light summer clothes. Height was measured to the nearest 0.1 cm with a microtoise. Body mass index (BMI) was calculated as weight (kg)/height (m<sup>2</sup>). Overweight and obesity are categorized according to cut-off values defined by the International Obesity Task Force [IOTF] (7).

To get a perspective of the severity of overweight and obesity, the prevalence of obesity was divided by the prevalence of overweight (and obesity), and this was called the obesity index.

A questionnaire pertaining to lifestyle and nutrition was administered by two research assistants. The questionnaire contained items about fruit and vegetable consumption, physical activity, television and computer time on the previous day and consumption of breakfast on the morning of the study.

Statistical analysis was performed using SPSS version 15.0. The chi-square test was used to calculate differences between groups. A *p*-value < 0.05 was considered statistically significant.

## RESULTS

Eighty-seven per cent (2148/2460) of 4–16-year old children living in Bonaire participated in the study, of which 49.6% (1065) were boys. The overall prevalence of overweight, including obesity, is 24.3% (259/1065) in boys and 31.9% (346/1083) in girls. For obesity, the prevalence is 9.9% (105/1065) and 13.7% (148/1083), respectively. In Fig. 1, the age and gender specific prevalence of overweight and obesity in children in Bonaire is given. The obesity index for 6–11-year old boys in Bonaire is 0.42, and for girls 0.40. For 12–16-year old children, the obesity index is 0.36 and 0.46, respectively. Table 1 depicts lifestyle and nutrition characteristics (food pattern, physical activity and screen time) of 74% (1581/2148) of children derived from the questionnaire. Information concerning the type of household was available for 82% (1758/2148) of children; of these, 57%

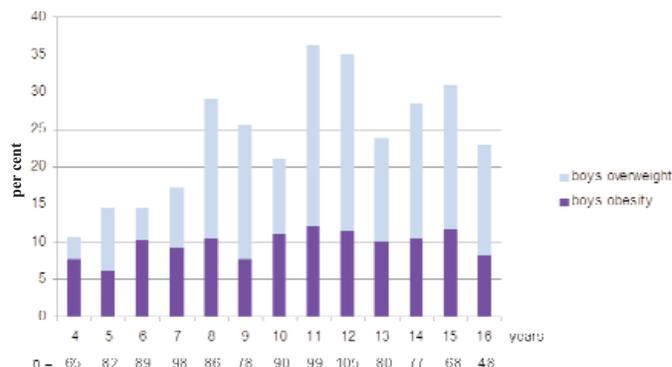


Fig. 1a: Prevalence of overweight and obesity in 4–16-year old boys in Bonaire.

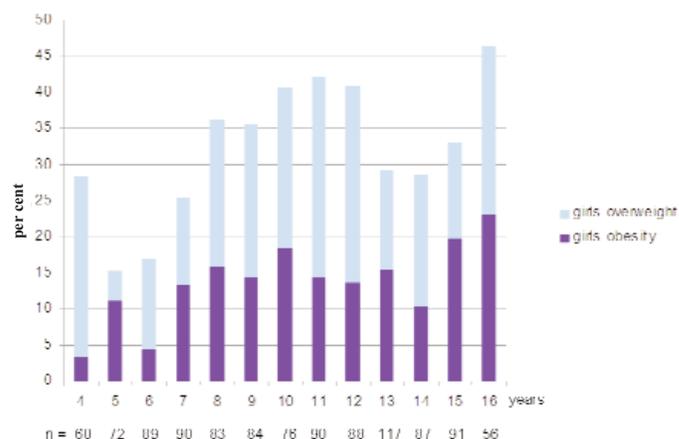


Fig. 1b: Prevalence of overweight and obesity in 4–16-year old girls in Bonaire.

Table 1: Lifestyle and nutrition characteristics of 74% (1581/2148) of children according to weight status in Bonaire

	Normal weight	Overweight	Obesity	nw-ov	nw-ob
	%	%	%	<i>p</i>	<i>p</i>
breakfast	70	65	70	ns	ns
vegetables	55	57	58	ns	ns
fruit ≥ 2 pieces	49	50	45	ns	ns
sweet beverage	73	69	71	ns	ns
fast-food	36	34	30	ns	ns
physical activity ≥ 1 h	56	49	45	< 0.05	< 0.05
physical activity ≥ 2 h	31	25	21	< 0.05	0.001
TV viewing > 2 h	27	26	27	ns	ns
TV in bedroom	46	49	49	ns	ns
computer > 2 h	14	12	15	ns	ns

Fruit and vegetable consumption, physical activity, television and computer time pertain to the previous day and breakfast to the morning of the study; measurements. nw-ov: children with normal weight compared to overweight; nw-ob: children with normal weight compared to obesity; ns: not significant.

(1041) belonged to a single parent household. Single parent households were evenly distributed among children with normal weight (57%), overweight (54%) and obesity (57%).

## DISCUSSION

The small population (14 000 residents) and surface area (111 square miles) of the island make it relatively easy to collect data from all children in Bonaire. Because of this, the participation in the study was high (87%).

More girls than boys in Bonaire are overweight and obese. The prevalence of overweight (including obesity) in children in the Caribbean is high, but varies among islands (Table 2). Compared to Bonaire, less children in St Lucia,

Table 2: Prevalence of overweight including obesity in children and adolescents in the Caribbean and the United States of America as defined by International Obesity Task Force (IOTF) criteria (7)

Country	Age years	Boys %	Girls %	n	Study year
<b>Children</b>					
Jamaica (9)	7–8 & 11–12	3.0–8.3	4.4–11.1	306	< 2000
St Lucia (8)	5	15.2	18.7	425	2006/2007
Bonaire	6–11	24.1	32.5	1052	2008
Unites States (2)	6–11	31.7	37.5	1037	2003/2004
Aruba (12)*	6–11	38.9	39.3	367	2004
Trinidad and Tobago (11)**	5–6 & 8–9	24.0–64.0	37.0–76.0	1934	1999
<b>Adolescents</b>					
Tobago (17)	12–18	11.9	19.1	3749	1999/2000
Barbados (10)	11–16	22.0	29	400	< 2006
Bonaire	12–16	28.1	34.4	817	2008
United States (2)	12–17	38.3	34.5	1736	2003/2004

\* recalculated using IOTF cut off values. The original article used criteria from the National Center for Health Statistics (USA); \*\* prevalence in children of African descent.

Jamaica and Barbados are overweight, while on the other hand, in Aruba and Trinidad and Tobago, more children are overweight (8–12).

Aruba, like Bonaire, is an island belonging to the former Netherlands Antilles in the Caribbean and is located close to Bonaire. Yet the prevalence of overweight and obesity in 6–11-year old children is significantly higher in Aruba compared to Bonaire. One of the most important factors influencing the prevalence of overweight and obesity in children is socio-economic status. Bonaire and Aruba have similar sociodemographic characteristics. While both islands depend on the tourism industry and have low unemployment, there are also some differences. The average annual household income in Bonaire is 11 400 USD while in Aruba it is 21 800 USD (13).

A possible explanation for the significantly higher prevalence of overweight in Aruba compared to Bonaire could be the presence of fast-food companies. A recent systematic review showed consumption of fast-food to be a

risk factor for overweight in children (6). Fast food is easily accessible due to the presence of numerous selling points and low prices in Aruba. In Bonaire, however, at the time of the study, there was only one small Kentucky Fried Chicken restaurant and there were no other fast-food chains. Nonetheless, in the absence of fast-food chains, children still eat the local fast food which frequently contains fat and sugar in abundance.

Approximately half of the children have an unhealthy food pattern: they consume less than two pieces of fruit a day and no vegetables. A recent survey on nutrition also showed that no more than 57% of adults in Bonaire consume vegetables and only 46% eat fruit on a daily basis (14). The high price of fresh vegetables and fruit may well be an inhibiting factor.

The National Association for Sports and Physical Education in the United States of America (USA) recommends that school-age children accumulate at least 60 minutes and up to several hours of physical activity per day while avoiding prolonged periods of inactivity (15). In Bonaire, significantly less over-weight (49%) and obese (45%) children are physically active for more than 60 minutes a day compared to normal weight (56%) children. Although from the present study we cannot conclude if this physical inactivity is the cause or the consequence of being overweight, a systematic review concluded that higher levels of regular physical activity are protective against child and adolescent obesity (16).

It is important to prevent or delay the transition from overweight to obesity. The obesity index is a tool that can be used to monitor this transition. Compared to Bonaire (0.42) the obesity index for 6–11-year old boys in Aruba (0.47) is higher but in the USA (0.34) it is lower. The same applies to 6–11-year old girls; their obesity index is 0.40 (Bonaire), 0.43 (Aruba) and 0.37 [USA] (2, 12).

## CONCLUSION

The prevalence of obesity in 4–16-year old children is high in Bonaire despite the low influence of fast-food companies on the island. Effective measures are urgently needed to prevent obesity in children in Bonaire. Prevention of overweight should focus on stimulating healthy eating habits and more physical activity.

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