

# THE BAEPENDI “LITTLE HEART” STUDY: strategies in child education related to cardiometabolic risk factors for reducing morbidity and mortality in a developing country

## Abstract

**Background:** The Baependi Heart Study is the first studies in Brazil clustering families for analyze the relationship between genetic and cardiovascular risk factors. It had started in 2005 with partnerships among some Brazilian Universities for research and outreach projects. Ten years later, a new project was developed. It was related to child and adolescent education for prevention of cardiovascular risk factors in school, followed by local teachers who continued to disseminate health promotion, since the goal is to reduce non-communicable chronic diseases, a major cause of global morbidity and mortality.

**Method:** The targeted audiences were county (local), state and private schools in the cities of Baependi, Juiz de Fora and Curitiba. In Baependi and Juiz de Fora, the focus is children from 4 to 12years old and our group have been promoting some activities: (1) A first talk to children to introduce a new Portuguese vocabulary and Sciences concepts (LDL-cholesterol, HDL-cholesterol, blood pressure, insulin, diabetes, for example). (2) A puppet plays presentation. (3) A new discussion on the interdisciplinary aspects (healthy habits, science, physics, history, culture, literature, art and philosophy) related to points previously discussed and presented in the play. (4) Playful activities: songs, games, hands on making a fruit salad, for example and trying to make them real actors of a healthy life style and grow a conscience about it. In Curitiba, we trained teachers to work with their students using the same steps described.

**Results:** The project developed in schools reached a total of 9,592people.

**Conclusion:** It can be possible, rewarding and non-expensive to carry out projects for health promotion and prevention of diseases, mainly chronic non-communicable diseases, involving children, adolescents and adults, when there is a linkage of research, teaching, care, public policies.

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## Introduction

The Baependi Heart Study is the first studies in Brazil clustering families for analyze the relationship between genetic and cardiovascular risk factors.<sup>1-6</sup> It had started in 2005 with partnerships among some Brazilian Universities for research and outreach projects.

Then, ten years later, in March, 2015 a new project was developed and it couldn't be more promising. It was called The Baependi “Little Heart” Study. It was related to child and adolescent education for prevention of cardiovascular risk factors in schools of three different cities. Local teachers keep disseminating concepts related to health promotion after learning this method, since the goal is to reduce non-communicable chronic diseases, a major cause of global morbidity and mortality have followed it.

The aim of this project was introduce concepts about prevention of some prevalent diseases in this country, improving physical activity and food inhabits, in a simple and cheap method to teach children about serious matter in a playful way.

## Methods

We worked using puppets (named Insulin, Pancreas, Heart, Carrot and so on) to teach about prevention of cardiovascular diseases, healthy lifestyle, hygiene habits and prevention of epidemic diseases

(Figure 1). It was mean to be fun for the kids. We needed only the play designed for this purpose, puppets and a frame with a curtain. And sometimes a microphone and an amplifier, for a large audience. The method is flexible in a matter of how to work on it. Students of medical, nutrition, and nurse schools were responsible for developing of activities at school, and sometimes the actors holding the puppets behind scenario could be the children (Figure 2).



**Figure 1** Pictures of the puppets and activities developed at fundamental schools.



**Figure 2** Students acted in the play presentation behind scenario.

The plays presented in 2015/2016 in Baependi, Juiz de Fora and Curitiba were: Stomach in love and a broken Heart; Fruit Salad in trouble; The Heart; Vitamin D and the little mice; Little Red Riding Hood and Diabetes; The girl and the baby teeth; Lulu, the caterpillar who didn't want to grow old; The firefly named Zezeca; The little fairy Luciferase and Not here, Mr. Aedes!

The targeted audiences are county, state and private schools in the cities of Baependi and Juiz de Fora, Minas Gerais State. We included children from 4 to 12years old and promoted: (1) A first talk to the children to introduce a new vocabulary and concepts (LDL-cholesterol, HDL-cholesterol, blood pressure, diabetes, H1N1 virus, aedes aegypt); (2) A play presentation; (3) A new discussion on the interdisciplinary aspects (healthy habits, science, physics, history, culture, literature, art and philosophy) previously discussed and presented in the play; (4) Playful activities: songs, games, hands on making a fruit salad, for example and trying to make them real actors of a healthy life style and grow a conscience about it. Later we trained teachers to work with their students the same steps described.

In the same year, in Curitiba, Parana State, we started to train the teachers of county and state schools with the help of the local government. The idea is to train them in order to disseminate even more the method and expand the number of reached children. We also encouraged teachers to let the students be the active part in the play presentation. The results were very promising, since the children were starting to make their own puppets. It had been to present these plays for special education schools. The children were very participative and opened to this new subject.

## Results

As we could see it is possible to educate a large number of people by using a little amount of money in order to prevent many of the known heart diseases. We spent approximately US\$ 200.00per month from Zerbini Foundation to spread the word to a total of 9,592children and adolescents in 23schools and 10,182 presentations. The play presentation and number of schools and students are in Tables 1&2.

**Table 1** City, play presentation and number of students

City	Play presentation	Students
Baependi	The stomach in love	675
Juiz de Fora		1434

Table continued

City	Play presentation	Students
Baependi	Fruit salad	831
Juiz de Fora		1615
Curitiba		510
Baependi	The Heart	758
Juiz de Fora		78
Baependi	Red Little Hat	580
Juiz de Fora		1484
Baependi	The baby teeth	268
Baependi	Lulu, the caterpillar	998
Baependi	Firefly Zezeca	413
Baependi	Not here, Mr. Aedes!	538
Total		10182

**Table 2** Education presentation in events

Public	Specification	City	Activity	Public
Professionals	Education	Curitiba	Fruit salad	30
Patients	Diabetic	Juiz de Fora	Fruit salad, Red Little Red	144
Patients	Diabetic	Juiz de For a	The Heart	56
Students	Deficiency	Curitiba	Cooking	50
Total				280

## Discussion

Childhood overweight and obesity is an important public health issue in many countries. The prevalence of obesity has increased by 30% in the last 20years. Obesity increased from 7 to 18% in the population aged 6 to 11 years and from 5 to 21% in adolescents, constituting the most prevalent pediatric nutritional disease, but in a stable situation between 2003-2004 e 2011-2012.<sup>7-9</sup> In Australia, 20-25% of children between 2-8years old are currently overweight or obese.<sup>10</sup>

Overweight and obesity rates differed only slightly across children's age groups, ranging from 22.8% for children aged 2 to 4years, to 26.6% for children aged 12 to 15years. Adverse outcomes associated with childhood overweight and obesity includes poorer health, slower cognitive and social development and social isolation and discrimination.<sup>11</sup> Importantly, obesity in childhood tends to persist into adolescence and adulthood, with 67% of obese children growing up to be obese adolescents and 70% of obese adolescents in turn growing up to become obese adults.<sup>11</sup> While the causes of childhood obesity are complex, one of the contributing factors is the over-consumption of energy dense foods, that is, foods high in fat, salt and sugar, such as most snack foods.<sup>11,12</sup> Parents are mainly responsible for determining the foods that young children eat.<sup>11</sup> They determine which foods are offered, the portion sizes and the frequency of eating occasions.<sup>11,13</sup>

In other study of our group, we provide the first evidence that a significant proportion of the variability of cardiovascular risk factors is explained by genetic factors in a sample of 1,666 individuals in 81families ascertained randomly from a highly admixed population

of a city in a Brazilian rural area in Baependi.<sup>1</sup> Heritability estimated for cardiovascular traits in the Brazilian population are high and not significantly different from other studied worldwide populations.<sup>1</sup>

On the other hand, overweight and obesity are undermining the quality of life of children, adolescents and adults in many countries. A significant proportion of Brazilian adolescents have alterations in their plasma lipids with high prevalence of low HDL cholesterol and hypertriglyceridemia, especially in Brazil’s North and Northeast regions.<sup>14</sup> The prophylaxis of these conditions consists in guiding, from the beginning of childhood, a healthy diet, rich in fiber, incentive to practice physical exercises and reduction of sedentary activities.<sup>15</sup>

Different of the More and Less Swedish Study based on positive parenting,<sup>16,17</sup> our study takes into account the power of children and adolescents to transform their lifestyles and their parents through a very enjoyable active school methodology that will allow these students to learn and acquire healthier eating habits and increase their physical activity, in addition to teach them for their families. Using puppets (named Insulin, Pancreas, Heart and so on) we can teach about healthy lifestyle, hygiene habits and prevention of epidemic diseases. Children and adolescents can help to change life style of all family by explaining to parents and brothers what they learned in the play presentation.

The evaluation of the program by the parents showed a high approval rate with changes in the habits of the whole family, more intense than the one observed in the request of the doctor to the member when it was diagnosed overweight or obesity, or even diabetes or hypertension.

## Conclusion

It can be possible, rewarding and non-expensive to carry out projects for health promotion and prevention of diseases, mainly chronic non communicable diseases, involving children and adolescents and adults, when there is a linkage of research, teaching, care, public policy and many sectors in a city. However, the effectiveness of these actions may be proven in the evaluation of this population in the course of a few years with a greater control of the risks of cardiovascular diseases.

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## Conflicts of interest

The authors declare that there is no conflict of interest.

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