## Obesity and physical fitness among children (6-10 years) from Azores islands (Portugal)

## V.P. Lopes, J.A.R. Maia

Polytechnic Institute of Braganca and Faculty of Sport Sciences and Physical Education; University of Porto, Portugal
$\qquad$
. Introduction


The prevalence of obesity and of lower levels of physical fitness seems to be a major problem for the public health. The WHO designates obesity as one of the most important public health threats because of the significant impact of chronic conditions associated with obesity. Physical fitness could act as a protective factor of various diseases, e.g. cardiovascular diseases.

The purposes of this study are: to determine the prevalence of obesity among school children (6-10 years old) from Azores islands (Portugal) by means of body mass index (BMI), to identify the levels of health related physical fitness (HPF), and to investigate the difference between obese and non-obese in HPF.
3. Results

| Age Zones | Trunk lift |  |  | Curl-up |  |  | Push-up |  |  | 1-mile run/walk |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 |
| Boys |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | 0.3 | 0.7 | 99.0 | 33.9 | 30.1 | 36.0 | 34.6 | 30.1 | 35.3 | 0.3 | 99.7 |  |
| 7 |  | 0.7 | 99.3 | 34.7 | 27.8 | 37.5 | 38.9 | 32.2 | 28.9 | 1.3 | 98.7 |  |
| 8 | - | - | 100 | 33.0 | 34.3 | 32.8 | 43.1 | 32.8 | 24.1 | 1.1 | 98.9 |  |
| 9 | - | - | 100 | 29.1 | 32.9 | 38.0 | 47.1 | 37.3 | 15.6 | 1.2 | 98.9 |  |
| 10 | - | - | 100 | 26.3 | 28.1 | 45.6 | 42.3 | 47.3 | 10.3 | 31.3 | 39.9 | 28.8 |
| Total |  |  |  |  |  |  | - 1913 |  |  |  |  |  |
| n | 1 | 5 | 1907 | 606 | 591 | 716 | 796 | 672 | 440 | 105 | 1726 | 81 |
| \% | 0.1 | 0.3 | 99.7 | 31.7 | 30.9 | 37.4 | 41.6 | 35.4 | 23.0 | 5.5 | 90.3 | 4.2 |
| Girls |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | 0.4 | - | 99.6 | 31.6 | 29.7 | 38.7 | 53.7 | 24.6 | 21.6 | 2.2 | 97.8 |  |
| 7 | 0.5 |  | 99.5 | 33.5 | 26.0 | 40.5 | 55.0 | 30.6 | 14.4 | 1.4 | 98.6 |  |
| 8 | - | 0.2 | 99.8 | 31.1 | 36.3 | 32.6 | 60.0 | 29.2 | 10.7 | 1.9 | 98.1 |  |
| 9 |  |  | 100 | 32.5 | 32.9 | 34.6 | 67.6 | 25.4 | 7.0 | 2.4 | 97.6 |  |
| 10 | 0.4 | - | 99.6 | 33.2 | 29.5 | 37.3 | 69.3 | 21.6 | 9.1 | 37.3 | 52.3 | 10.4 |
| Totaln$\%$ |  |  |  |  |  |  | 1829 |  |  |  |  |  |
|  | 4 | 1 | 1824 | 591 | 569 | 666 | 1116 | 492 | 220 | 121 | 1682 | 25 |
|  | 0.2 | 0.1 | 99.7 | 32.4 | 31.2 | 36.5 | 61.1 | 26.9 | 12.0 | 6.6 | 92.0 | 1.4 |

Percentage of sucess (zone q and 2) in four HPF test tems by gender and age

| Age | Girls |  | Boys |  |
| ---: | :---: | :---: | :---: | :---: |
| $\%$ |  | Confidence <br> interval (95\%) | $\%$ <br> Confidence <br> interval (95\%) |  |
| 6 | 40 | $34-46$ | 49 | $43-55$ |
| 7 | 37 | $32-42$ | 45 | $40-50$ |
| 8 | 32 | $28-37$ | 45 | $40-50$ |
| 9 | 27 | $23-31$ | 40 | $35-45$ |
| 10 | 18 | $13-22$ | 39 | $33-45$ |

The ratios of sucess in tests of HPF both in boys and girls vere low. In girls ther was a substantial decrease of ratio of sucess beteween 6 and 10 years of age. In 10-year-old girls the global ration of sucess was only $18 \%$. In boys the rations of suces hal also a tendency to diminish
along age. In 10-years-old boys the global ratio of sucess was $39 \%$.
2. Material and Methods
2.1 Sample

The sample comprises 3742 children of both genders between 6-to-10 years of age from Azores islands Portugal, which is approximately $25 \%$ in each gender and age of the residents in each island

| Age | Boys | Girls | Total |
| :--- | :---: | :---: | :---: |
| 6 | 269 | 286 | 555 |
| 7 | 431 | 453 | 884 |
| 8 | 428 | 464 | 892 |
| 9 | 460 | 429 | 889 |
| 10 | 241 | 281 | 522 |
| Total | 1829 | 1913 | 3742 |

2.2 Physical Fitness Evaluation

HPF was evaluated with FITNESSGRAM:
1-mile run/walk,
curl-ups,
push-ups,
trunk lift.
FITNESSGRAM is a health related physical fitness test battery. Subjects are compared not to each other, but to health fitness standards, i. e, the evaluation is related to the criterion. For each test item there are 3 zones: 0-needs improvement, 1healthy fitness zone, 2-very good
We calculated the percentage of children in each zone.

### 2.3 Obesity Evaluation

The children were evaluated in height and weight and then the BMI (weight in kilograms divided by the square of height in meters $\mathrm{kg}^{*} \mathrm{~m}$-2) was calculated
To classify the children as obese or non-obese we used the cut values proposed by Cole et al. (2000)

### 2.4 Statistical Procedures

The difference between obese and non-obese in HPF was analysed with MANCOVA, with age as covariate.

Percentage of children obese and no obese by gender and age acording the cut values proposed by Cole et al. (2000)


We found that the prevalence of obesity was between 10.9\% and $13.7 \%$ for girls, and between $8.2 \%$ and $13 \%$ for boys.

The results of MANCOVA show that obese children of both genders have lower HFP levels than no obese children (girls: $\lambda=0.887$; $F(4,1782)=51.05 ; p<0.001$; boys: $\lambda=0.852 ; F(4,1880)=81.37$; $p<0.001$ )

## 4. Conclusions

There is a high prevalence of obesity in children of both genders from Azores islands.
The failure in passing the rates of FITNESSGRAM tests is relatively high.
The obese children have lower HPF levels than non-obese children.
5. References

COLE. T. J.; BELLIZZI, M. C.; FLEGAL, K. M.. DIETZ. W. H. (2000). Estabishing a standard definition for child overweight

