

# Physical activity and diet in 5 to 7 years old children

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## Abstract

**Objective:** To assess the possible associations between physical activity, diet, social state and overweight in children.

**Design:** Crosssectional study on 1468 children aged between 5 and 7 years old in Kiel, northwest Germany.

**Methods:** Assessment of physical activity and social factors by a questionnaire, food frequency record, body composition analysis by anthropometrics and bioelectrical impedance analysis.

**Results:** 23% of our children were overweight or obese. Low levels of physical activity (as assessed by TV viewing time) were associated with increased body mass index and a higher prevalence of overweight. TV-viewing of more than 1 h per day was associated with a high consumption fast food, sweets, chips and pizza whereas fruits and vegetables were less frequently consumed. Overweight, inactivity and unhealthy eating habits were seen more frequently in families with a low social status.

**Conclusions:** In 5 to 7 years old children, overweight is associated with physical inactivity, unhealthy eating habits and a low social status. Primary prevention efforts should be directed to low income families.

**Keywords**  
Overweight and obesity  
in children  
Physical activity  
Inactivity  
Childhood nutrition  
Social state

## Introduction

Childhood obesity has a high and increasing prevalence suggesting that without prevention and treatment health and social consequences will be both substantial and long lasting. Obesity prevention is necessary but obesity prevention programmes are limited<sup>1,2</sup>. In 1995, the Kiel Obesity Prevention Study (KOPS) was started as a cross-sectional as well as a longitudinal intervention study. Between 1995 and 1999 a total of 3400 children aged between 5 and 7 years old were recruited. A further 1500 children will be recruited until the year 2001. The total cohort will be followed for a period of 8 years. Reinvestigations are planned after 4 and 8 years. In parallel, interventions for children (health education at school), teachers (health promotion programme), parents (information about healthy eating practices) as well as families with obese children with or without obese parents (social support, behaviour change strategies) are offered. These interventions intend enhancing healthy eating practices and physical activity patterns and achieving healthy weights in children and adolescents. Up to now interventions have been offered to 751 children, 30 teachers and 36 families.

## Methods

The data set of KOPS allowed us to analyze possible

risk factors of obesity in children aged between 5 and 7 years old. Assessment tools included a detailed parenteral reported questionnaire regarding physical activities, social status, health habits and health of the parents as well as retrospective factors like birth weight, weaning, growth and development during the first 2 years of life etc. (for details see refs 3 and 4). A detailed food frequency questionnaire including a number of food items preferred by children was used to assess eating practices and a diet quality index was calculated<sup>3</sup>. In addition body composition analysis was performed by the combined use of anthropometrics and bioelectrical impedance analysis<sup>4</sup>. Overweight was defined as a Triceps skinfold thickness of >90. TSF percentile according to reference data from the Forschungsinstitut für Kinderernährung in Dortmund<sup>5</sup>.

## Statistics

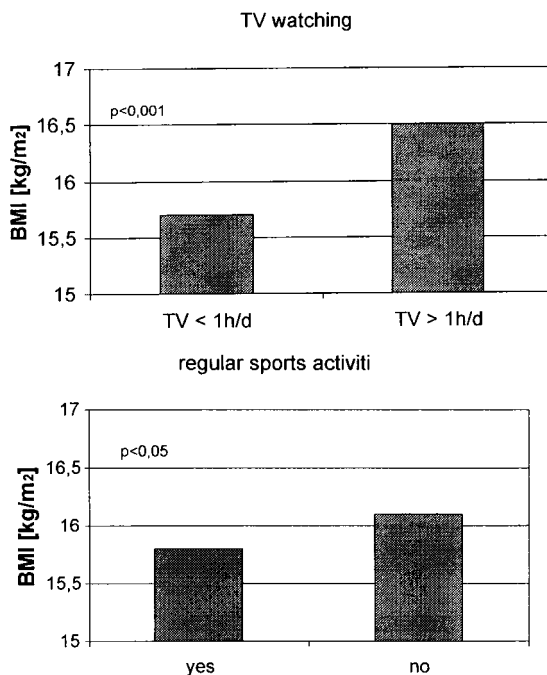
Data were analyzed using SPSS 6.3 for windows 95. Differences between groups were tested with a U-Test according to Mann and Whitney or with a Student t-Test/Chi-square-test for significance. The influence of possible confounding factors was tested by multiple regression analysis.

## Results

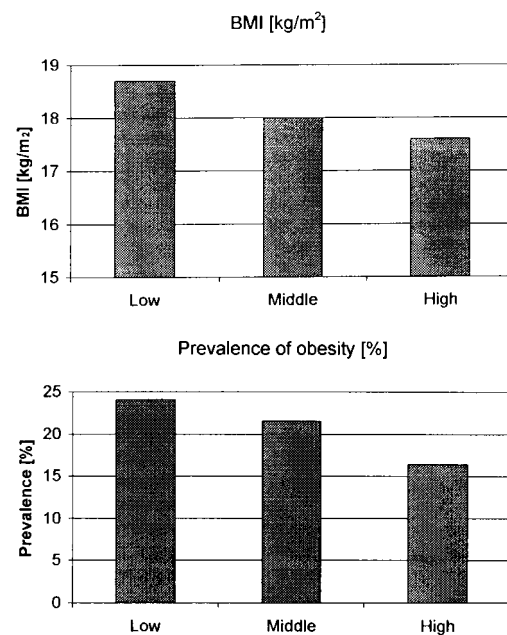
Up to 1998 a total of 1497 children, 739 boys (range,

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height 100 and 138 cm, body weight 15.0–45.0 kg, BMI 11.2–32.1 kg/m<sup>2</sup>, triceps skinfold, 2.6–25.3 mm) and 758 girls (height, 100–138 cm, 11.4–45.0 kg, BMI, 9.3–25.1 kg/m<sup>2</sup>, triceps skinfold, 3.3–27.0 mm) were recruited. From this group 23% were overweight. There were no differences in the diet quality index between overweight and normal weight children. More than 80% of the children were in line with the German recommendations for a healthy diet<sup>3,6</sup>. There was an association between measures of inactivity (numbers of hours a day spent by TV watching or regular sport activities, Fig. 1a and b) and BMI suggesting that inactivity increases BMI and also the prevalence of overweight in children. Physical inactivity was also associated with unhealthy eating practices. The prevalence of a high consumption of fast food (daily or several times per week) and regular sweet consumption was significantly increased in children watching more than 1 h TV per day when compared to those children watching less than 1 h TV per day (daily/several times vs rare/never: 5.4 vs 1.0% (Fast Food) and 86.5 vs 69% (sweets), respectively,  $P < 0.001$  for both parameters). Social status had a significant influence on physical inactivity. Children watching more than 1 h TV per day were more frequently found in families with a low social status (36.2% vs 27.6% vs 13.4%, low vs middle vs high social status  $P < 0.01$ ). Mean group BMI and also the prevalence of overweight were influenced by the social status showing highest values in children from a low social status (Fig. 2a and b).



**Fig. 1** (a) Association between BMI of 801 5–7 year old children and TV watching time and (b) regular sports activities



**Figure 2** (a) Association between BMI and (b) prevalence of obesity in 801 5–7 year old children according to social status of parents. Social status was defined by school education level. low vs. middle:  $P < 0.001$ , low vs high:  $P < 0.001$ , middle vs high: n.s.

## Conclusion

In children aged between 5 and 7 years old physical inactivity, unhealthy eating habits as well as a low social status were all associated with a higher prevalence of overweight suggesting that primary prevention efforts enhancing healthy eating practices and physical activity and achieving healthy body weights should be targeted to low income families.

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