

Meal patterns and food use in 10- to 11-year-old Finnish children

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Abstract

Objective: To describe the meal patterns and food use on weekdays among 10- to 11-year-old Finnish children and to analyse these in relation to family's socio-economic status and the child's behaviour.

Design: Cross-sectional study on a cohort of 404 children aged 10–11 years in the rural town of Ylivieska, mid-western Finland.

Methods: A food-frequency questionnaire including questions on meal patterns and food use and the Child Behaviour Checklist (CBCL) completed by the parents and the child together.

Results: Practically all children (99%) ate breakfast regularly, 94% had a daily school lunch and 80% had dinner at home daily. Vegetables were consumed daily at home by 26% and fruits or berries by 21%, while 46% of the children had salad daily at school. Twenty-four per cent ate sweets daily or nearly so on weekdays. The children from families of high socio-economic status ate vegetables more often, and fewer of them used butter or high-fat milk. The children with no regular family dinner ate sweets and fast foods more often, and had higher total CBCL problem scores than those with a regular family dinner.

Conclusion: Skipping meals appears not to be common among Finnish children aged 10–11 years, but a considerable proportion consume sweets frequently and vegetables infrequently. High family socio-economic status and a tendency to eat together are associated with healthy food choices among schoolchildren.

Keywords
Food habits
Food use
Meal patterns
Children
Socio-economic status

Parents play an important role in the development of food habits and food preferences among young children^{1,2}. Economic and educational factors are also important determinants of food habits in childhood, since unhealthy eating among children is associated with low family socio-economic status^{3–6}. There is also some evidence that a regular family dinner may improve the quality of diet of both children and adolescents^{7,8}. Food choices and meal patterns may also reflect other events in the life of the child, e.g. gastrointestinal problems and food allergies.

There are few studies on the meal patterns and food use of Finnish children in primary schools. In Finland, a free school lunch consisting of a warm meal, salad, bread and milk or water is offered every school day to all children in primary and secondary schools. According to a recent study, 75% of 15–16-year-old Finnish girls and 83% of boys eat school lunch⁹. In the other Nordic countries many adolescents skip breakfast and school lunch, but most have dinner at home^{6,10,11}. Irregular eating seems to increase with the age of the child, and skipping meals occurs among adolescents^{12,13}, but it is not known whether primary-school children display similar irregularity in their meal patterns.

The aim of the present study was to describe meal patterns and food use of 10- to 11-year-old Finnish children on weekdays and to analyse these in relation to the socio-economic status of the family and the behaviour of the child. We were also interested in establishing the occurrence of food avoidance, especially avoidance of milk, in this age group. Results on the occurrence of various gastrointestinal symptoms in relation to meal patterns and food use and the behaviour of the children will be published separately.

Methods

Subjects

All 422 children aged 10–11 years and living in the rural town of Ylivieska were invited to participate in the study. Ylivieska is located in mid-western Finland and has an urbanisation degree of 8, indicating that 80–90% of the inhabitants live in the built-up area¹⁴. The participation rate was 96% and complete dietary data was obtained from 404 subjects (196 girls and 208 boys). Of these, only one used a vegetarian diet and one was a diabetic. Data on the body weight and height of the children measured within six months of completing the questionnaires was obtained

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from the local health centre register. Nearly a fifth of the children (16%) weighed 20% above the normal growth curve, while 5% were underweight by 15% or more. Most of the fathers (43%) were workers; 22% upper white-collar, 17% lower white-collar and 13% were entrepreneurs.

Study protocol

The protocol included a food-frequency questionnaire, and the Child Behaviour Checklist (CBCL)¹⁵. The questionnaires were distributed by the staff nurses at schools to the 4th and 5th grades at all 12 primary schools in the town. The questionnaires were filled in by the parents together with the child at home between September and October 1999, and returned to the teachers.

Dietary data

The food-frequency questionnaire was pre-tested in the Department of Pediatrics of Oulu University Hospital. The questionnaire consisted of 39 questions on the use of various foods by the children and 16 questions on their meal patterns. The data on food use were expressed as frequencies ranging from daily to never (for drinks, from several times a day to never). The group of fast foods included French fries, pizzas, hamburgers, meat pies and chips/pop corns/salt sticks. If the child used milk with varying fat content, only the most commonly used was recorded. The sweets group included candies and chocolate. The patterns for the main family meal were canvassed using the following statements: 'We tend to eat at the same time', 'The whole family tends to eat together' and 'We prepare a hot meal'. The data were recorded as frequencies (daily, almost daily, weekly or more seldom, never). We used the expression 'regular family dinner' if the family tended to eat together daily or almost daily on weekdays, and 'irregular family dinner' if they tended to eat together weekly or more seldom or never. The parents were also asked to report their child's usual meal times and the content of snacks, but the usual content of breakfast or dinner at home was not inquired about.

An indicator describing unhealthy eating was produced from the following food habits: (1) consuming mostly bread other than rye bread (rye bread provides 45% of the daily fibre in the Finnish diet)¹⁶, (2) drinking mainly fat-containing milk (milk fat provides 21–33% of the saturated fats in the Finnish diet)¹⁶, (3) using butter or butter–oil mixture on bread (butter provides 15–21% of the saturated fats in the Finnish diet)¹⁶, (4) consuming sweets daily or almost so, (5) eating fast food daily or nearly daily, (6) consuming sugar-containing juices or soft drinks more than once a day, (7) not eating vegetables at home daily, and (8) not eating fruit or berries daily. Each of these eating habits was graded as one point, the value of the indicator consequently ranging from 0 to 8.

Socio-economic status

The occupation of the parents was canvassed, but not the income of families. Since the mother's and father's occupations correlated significantly ($\chi^2 = 97.4$, $P < 0.001$), the father's occupation was used in the analysis as an indicator of the socio-economic status of the family. Occupation was coded into seven groups using the standard occupational classification¹⁷: (1) upper white-collar, (2) lower white-collar, (3) workers, (4) entrepreneurs, including farmers, (5) students, (6) pensioners and (7) other, including housewives. Groups 5–7 were combined in the analyses.

Child Behaviour Checklist

The CBCL is a standardised questionnaire for screening the behavioural and emotional problems of children¹⁵, based on clinical practice in the diagnosis of children referred to child psychiatric services. The present study employed only the total CBCL problem score, which is the sum of withdrawn, somatic complaints, symptoms of anxiety and depression, social problems, cognitive problems, attention problems, and delinquent and aggressive behaviour.

Ethical considerations

The Ethical Committee of Oulu University Hospital has accepted the study protocol. The parents and the children were informed about the nature of the study and the parents signed an approval form.

Statistical analysis

SPSS 10.0 for Windows was used in the statistical analysis of the data. The categorised variables were analysed by the chi-square test and by Fisher's exact test if the chi-square test was not appropriate. Continuous variables were analysed by Student's *t*-test or the Mann–Whitney *U*-test. Logistic regression was used in explaining the unhealthy food choice index, and the results were reported as adjusted odds ratio (OR) with 95% confidence interval (CI). In the model the dependent variable was the index of unhealthy food choices (cut-off point 4), and the covariates were gender, father's occupation, family dinner and the total CBCL problem score. Because of missing values, body weight was not used in the model.

Results

Meal patterns

In general, the daily meal pattern of the children was regular on weekdays. Nearly all of the children ate breakfast daily (99%) as well as school lunch (94%). Dinner was prepared daily in 80% of the families. Most reported having regular family dinner on weekdays, 54% eating together daily, 38% almost daily and 8% seldom or never. Eating at fast food outlets or other restaurants was not common on weekdays.

Food use

At home, only a quarter of children ate vegetables, fruits or berries or skimmed milk daily and less than half used soft margarine on bread. A fifth of the children had sweets daily or nearly so, but a few of them had fast food or soft drinks regularly during weekdays. Most of the children ate regularly at school, having a main meal, milk or water and bread, but only half chose salad daily with their school lunch. Only minor differences were found in food choice between girls and boys. The girls restricted their use of milk more often (14% vs. 6%, $\chi^2(1) = 6.0$, $P = 0.014$), chose salad more often ($\chi^2 = 6.2$, $P = 0.013$) and chose sausages ($\chi^2(1) = 6.1$, $P = 0.014$) and high-fat milk ($\chi^2(1) = 4.4$, $P = 0.036$) less often than the boys (Table 1).

Altogether 10% of the children avoided or restricted their use of milk or dairy products, and 25 children (6%) did not drink milk at all. All but seven regularly consumed some dairy product and none of the children had a milk-protein-free diet. Low lactose milk was used by 5% of the children. Fruits were avoided by 6%, vegetables by 4% and other foods like fish, meat, nuts, chocolate, spices and/or some particular dish by 8% of the children.

Factors associated with food use

The children's food habits were associated with their father's occupation and the family meal patterns. There were significant differences in the use of vegetables, butter, high-fat milk and sweet pastries/biscuits between socio-economic classes (Table 2). The daily use of vegetables was more common among families with the

highest socio-economic status ($\chi^2(1) = 10.7$, $P = 0.03$), and the use of butter ($\chi^2(1) = 3.9$, $P = 0.006$) and high-fat milk ($\chi^2(1) = 5.0$, $P < 0.001$) less common than among families of lower socio-economic status. Children with a regular family dinner ate sweets ($\chi^2(1) = 4.5$, $P = 0.034$) and fast food less often (Fisher's exact test, $P = 0.033$), but juice more often ($\chi^2(1) = 5.1$, $P = 0.024$) than children without a regular family dinner (Table 3). Moreover, children with a regular family dinner had lower emotional/behavioural problem scores than those from families eating dinner together seldom or never (Mann-Whitney test, $U = 3510.0$, $P = 0.006$).

Daily use of vegetables at home was associated with daily consumption of fruit or berries ($\chi^2(1) = 57.1$, $P < 0.001$) and eating salad every day at school ($\chi^2(1) = 34.4$, $P < 0.001$). The children who had daily or almost daily sweets on weekdays ate fast food ($\chi^2(1) = 15.7$, $P = 0.017$), sausages ($\chi^2(1) = 10.4$, $P = 0.016$), corn flakes ($\chi^2(1) = 9.7$, $P = 0.021$) and ice cream ($\chi^2 = 14.4$, $P = 0.002$) more often, but had porridge less often ($\chi^2(1) = 15.3$, $P = 0.004$), and fewer of them had a regular family dinner ($\chi^2(1) = 14.5$, $P = 0.044$) than those eating sweets less often.

Unhealthy food choices

The most common unhealthy food choices were infrequent use of vegetables, fruit and berries, skimmed milk and soft margarine, and frequent use of sweets. A fifth of the children (21%) made more than four unhealthy food choices. The children from families of high socio-economic status made fewer unhealthy food

Table 1 Meal patterns and food use among 10- to 11-year-old Finnish schoolchildren in Ylivieska during weekdays

	All*	Girls (%) (n = 196)	Boys (%) (n = 208)	P-value	χ^2 -test (df = 1)
<i>At school</i>					
Eat school lunch†	397 (94)	93	96		
Main meal†	361 (92)	90	95		
Salad†	180 (46)	53	40	0.013	6.2
<i>At home</i>					
Vegetables†	103 (26)	28	24		
Fruit/berries†	80 (21)	18	24		
Fat on bread	375 (99)	98	99		
Soft margarine	168 (44)	43	45		
Butter-oil mixture	182 (48)	50	46		
Butter	29 (8)	7	9		
Milk	373 (94)	92	96		
Skimmed	98 (27)	28	25		
Low-fat (1–1.5% fat)	238 (65)	67	63		
High-fat ($\geq 3.5\%$ fat)	23 (9)	6	12	0.036	4.4
Soft drinks/sugar juices‡	180 (46)	47	34		
Juice†	160 (41)	40	42		
Fast food‡	34 (9)	7	10		
Sausages‡	135 (34)	28	40	0.014	6.1
Sweet pastries/biscuits‡	98 (25)	26	24		
Sweets‡	94 (24)	23	26		

* Values given as n (%).

† Daily.

‡ Daily or almost so.

Table 2 Consumption of various foods at home by 10- to 11-year-old Finnish schoolchildren by father's occupation category

	Entrepreneur (%) (n = 48)	Upper white-collar (%) (n = 80)	Lower white-collar (%) (n = 63)	Worker (%) (n = 159)	Other (%) (n = 17)	P-value	χ^2 -test (df = 4)
Vegetables*	21	40	18	26	29	0.030	10.7
Fruit or berries*	19	33	20	17	19		
Spread on bread	100	99	97	99	100		
Soft margarine	32	43	38	46	38		
Butter–oil mixture	46	54	53	47	50		
Butter	22	3	7	7	13	0.006	3.9
Milk	92	94	92	95	88		
Skimmed	14	32	29	27	27		
Low-fat (1–1.5% fat)	49	65	68	66	73		
High-fat (\geq 3.5% fat)	37	3	4	7	–	<0.001	50.0
Soft drinks/sugar juices*	44	41	42	52	43		
Juice*	61	58	52	64	44		
Fast food†	13	5	8	7	24		
Sausages†	35	20	37	35	47		
Sweet pastries/biscuits†	38	20	19	22	50	0.015	12.4
Sweets†	19	27	24	25	33		

* Daily.

† Daily or almost so.

choices than those from families of lower socio-economic status (3.1 vs. 3.7, $t(284) = 3.0$, $P = 0.003$). Similarly, the children sharing a regular family dinner had fewer unhealthy food habits than those without one (3.5 vs. 4.3, $t(313) = -3.1$, $P = 0.002$). The mean number of unhealthy food choices was not significantly different between the girls and boys (3.5 vs. 3.6) or in those with a CBCL score over 22 (75th percentile) (3.7 vs. 3.5).

Children from the families having irregular family dinner during weekdays and those from families of low socio-economic status had a three times greater risk of making

many unhealthy food choices (OR 3.5, 95% CI 1.4–9.0 and OR 3.0, 95% CI 1.2–7.6, respectively) (Table 4).

Discussion

Most of the 10–11-year-old schoolchildren participating in the study had regular meals both at home and school. However, only half the families tended to eat dinner together daily and a considerable proportion of the children ate vegetables, fruit and berries infrequently, and sweets frequently. Unhealthy food habits were more

Table 3 Food use by 10- to 11-year-old Finnish schoolchildren in families eating dinner together regularly vs. those not doing so

	Regular family dinner (%) (n = 367)	No regular family dinner (%) (n = 30)	P-value	χ^2 -test (df = 1) or Fisher's exact test
<i>At school</i>				
Eat school lunch†	94	93		
Main meal†	93	86		
Salad†	47	35		
<i>At home</i>				
Vegetables†	26	13		
Fruit or berries†	20	24		
Spread on bread	99	96		
Soft margarine	46	27		
Butter–oil mixture	47	62		
Butter	7	12		
Milk	94	90		
Skimmed	27	22		
Low-fat (1–1.5%)	64	63		
High-fat (\geq 3.5%)	7	15		
Soft drinks/sugar juices†	47	40		
Juice†	61	40	0.024	5.1
Fast food‡	8	20	0.033	*
Sausages‡	34	37		
Sweet pastries/biscuits‡	25	23		
Sweets‡	23	40	0.034	4.5

* Fisher's exact test.

† Daily.

‡ Daily or almost so.

Table 4 Factors associated with having many unhealthy food habits (>4) among 10- to 11-year-old Finnish schoolchildren

	OR	95% CI	P-value
Sex: male	1.5	0.8–2.6	
Father is not upper white-collar	3.0	1.2–7.6	0.017
Irregular family dinner	3.5	1.4–9.0	0.008
Total CBCL problem score	1.00	0.98–1.02	

OR – odds ratio; CI – confidence interval; CBCL – Child Behaviour Checklist.

common among the families of low socio-economic status and those not eating dinner together regularly.

Since the present study population was collected from an average size rural Finnish town with a considerable degree of urbanisation, our results can be applied to most of the rural and small urban areas in Finland, excluding a few large cities with a different population in social terms. The high participation rate (96%) means that the present study provides a reliable picture of the food habits of Finnish children of primary-school age, among whom no large-scale surveys have been done.

We found only a few children skipping meals on weekdays. This is in agreement with previous studies in the Nordic countries showing that younger children have more regular meal patterns than adolescents^{12,13}. However, it has been shown that the meal patterns and food choices of children and adolescents differ from weekdays to weekends^{3,11,12}. The reported food habits of our study population might well have been different on the weekend.

Data on meal patterns within the family are limited and the prevalence of regular family dinners is not known. In the present study, a regular family dinner was associated with healthy food choices. Other recent studies have also shown the beneficial effect of a family dinner on the quality of the diet of children aged 9 to 14 years^{7,8}, and adolescents who miss breakfast or lunch tend to have a poorer diet than those who habitually have these meals¹⁸. Samuelson⁹ found that adolescents from families of low socio-economic status had snacks and sweets more frequently and their meal patterns were more irregular than in families of higher socio-economic status. Moreover, we found that the children without a regular family dinner had higher behavioural problem scores than children with a regular family dinner, although all but five children had scores within the normal range. Less organised meal patterns together with a greater number of behavioural or emotional problems among the children may reflect other problems within the family (marital problems, unemployment, or illness), and these factors may influence the eating habits of the family.

Daily consumption of fruits and vegetables and the use of low-fat dairy products have been suggested as indicators of a healthy diet⁵. Consumption of fruit, juice and vegetables has been associated with parental modelling, normative peer beliefs and the availability of these foods¹⁹.

In our study less than half the children ate vegetables regularly, and only a quarter used mainly skimmed milk. Similarly, in the Belgian Adolux Study, 56% of the 12–17-year-old adolescents ate fruits daily and 40% ate vegetables daily²⁰. School lunch has been regarded as an important contributor to fruit and vegetable consumption among elementary school students²¹. It seems probable that vegetables are not offered regularly in all families, but that school lunch promotes the use of vegetables among those consuming vegetables at home seldom.

Girls appeared to be more weight-conscious than boys in choosing salad more often at school and sausages less often at home. Restricted milk use was also more common among girls than boys. In a previous Finnish study from the 1980s, milk avoidance increased with the age of the child and was common among adolescent girls²². Räsänen and co-workers²³ concluded that the diet of 9–24-year-old females was closer to the recommendations than that of males. In the Belgian Adolux Study girls also had healthier food habits, choosing vegetables and fruit more often, and chocolate, lemonade and eggs less often than boys²⁰.

The present study corroborates the observation that children's food habits are related to the socio-economic status of the family, a factor that may also influence the availability of wholesome foods at home. In our study, the children of upper white-collar fathers made better choice of food, eating vegetables and fruit and berries more often than other children. The previous Finnish studies show that children of families of higher socio-economic status eat more fruit, low-fat milk, soft vegetable margarine and less high-fat milk, butter, rye products and coffee than children of families of lower socio-economic status^{4,5}. Socio-economic factors seemed to be more important for the food habits of those below teenage^{4,10}.

The present study shows that family meal patterns have an important role in children's food habits, eating together being associated with better food choices by children aged 10–11 years. Low socio-economic status was also associated with children's food habits, perhaps by limiting the availability of wholesome foods at home and/or providing a poor parental model. The significance of the association between the children's emotional and behavioural problems and family meal patterns needs to be evaluated in more detail.

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References

- 1 Gibson EL, Wardle J, Watts CJ. Fruit and vegetable consumption, nutritional knowledge and beliefs in mothers and children. *Appetite* 1998; **31**: 205–28.

- 2 Koivisto Hursti UK. Factors influencing children's food choice. *Ann. Med.* 1999; **31**(Suppl. 1): 26–32.
- 3 Räsänen L, Ahola M, Kara R, Uhari M. Atherosclerosis precursors in Finnish children and adolescents. VIII. Food consumption and nutrient intakes. *Acta Paediatr. Scand. Suppl.* 1985; **318**: 135–53.
- 4 Prättälä R. Socio-demographic differences in fat and sugar consumption patterns among Finnish adolescents. *Ecol. Food. Nutr.* 1988; **22**: 53–64.
- 5 Laitinen S, Rasanen L, Viikari J, Akerblom HK. Diet of Finnish children in relation to the family's socio-economic status. *Scand. J. Soc. Med.* 1995; **23**(2): 88–94.
- 6 Höglund D, Samuelson G, Mark A. Food habits in Swedish adolescents in relation to socio-economic conditions. *Eur. J. Clin. Nutr.* 1998; **52**: 784–9.
- 7 Gillman MW, Rifas-Shiman SL, Frazier AL, Rockett HR, Camargo CA Jr, Field AE, *et al.* Family dinner and diet quality among older children and adolescents. *Arch. Fam. Med.* 2000; **9**: 235–40.
- 8 Stockmyer C. Remember when mom wanted you home for dinner? *Nutr. Rev.* 2001; **59**(2): 57–60.
- 9 Hirvonen T, Lahti-Koski M, Roos E, Pietinen P, Rimpelä M. Food choices and school lunch eating among adolescents. *J. Soc. Med.* 1999; **36**: 162–71.
- 10 Samuelson G. Dietary habits and nutritional status in adolescents over Europe. An overview of current studies in the Nordic countries. *Eur. J. Clin. Nutr.* 2000; **54**(Suppl. 1): 21–28.
- 11 Samuelson G, Bratteby LE, Enghardt H, Hedgren M. Food habits and energy and nutrient intake in Swedish adolescents approaching the year 2000. *Acta Paediatr. Suppl.* 1996; **415**: 1–20.
- 12 Hagman U, Bruce A, Persson LA, Samuelson G, Sjolín S. Food habits and nutrient intake in childhood in relation to health and socio-economic conditions. A Swedish Multicentre Study 1980–81. *Acta Paediatr. Scand. Suppl.* 1986; **328**: 1–56.
- 13 Frost Andersen L, Nes M, Bjorneboe G-EA, Drevon CA. Food habits among 13-year-old Norwegian adolescents. *Scand. J. Nutr.* 1997; **41**: 150–4.
- 14 *Statistical Yearbook of Finland 2000. Statistics Finland, Vol. 95 (New Series)*. Keuruu, 2000.
- 15 Achenbach TM. *Manual for the Child Behaviour Checklist and 1991 Profile*. Burlington, VT: University of Vermont, Department of Psychiatry, 1991.
- 16 *The 1997 Dietary Survey of Finnish Adults*. National Public Health Institute B8/1988. Helsinki, 1998.
- 17 *Classification of Occupations 2001. Statistics Finland, Handbooks 14*. Helsinki, 2001.
- 18 Frost Andersen L, Nes M, Bjorneboe G-EA, Drevon CA. Dietary intake among Norwegian adolescents. *Eur. J. Clin. Nutr.* 1995; **49**: 555–64.
- 19 Cullen KW, Baranowski T, Rittenberry L, Cosart C, Hebert D, de Moor C. Child-reported family and peer influences on fruit, juice and vegetable consumption: reliability and validity of measures. *Health Educ. Res.* 2001; **16**(2): 187–200.
- 20 Paulus D, Saint-Remy A, Jeanjean M. Dietary habits during adolescence – results of the Belgian Adolux Study. *Eur. J. Clin. Nutr.* 2001; **55**: 130–6.
- 21 Baranowski T, Smith M, Hearn MD, Lin LS, Baranowski J, Doyle C, *et al.* Patterns in children's fruit and vegetable consumption by meal and day of the week. *J. Am. Coll. Nutr.* 1997; **16**(3): 216–23.
- 22 Prättälä R, Rahkonen O, Rimpelä M. Consumption patterns of critical fat sources among adolescents in 1977–1985. *Nutr. Res.* 1986; **6**: 485–98.
- 23 Räsänen L, Laitinen S, Stirkkinen R, Kimppa S, Viikari J, Uhari M, *et al.* Composition of the diet of young Finns in 1986. *Ann. Med.* 1991; **23**: 73–80.