The influence of family structure on breakfast habits among adolescents

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ABSTRACT

INTRODUCTION: Regular breakfast habits are important for the health and well-being of young people. The family is an important setting for developing regular breakfast habits. The objectives of the present study are to study the association between family structure and the regularity of breakfast habits among children and adolescents, and to analyse whether such potential association is modified by gender.

MATERIAL AND METHODS: Data are from the Danish contribution to the international study entitled Health Behaviour in School-aged Children, 2006. Participants are school children aged 11, 13 and 15 drawn from a random sample of Danish schools. The response rate was 88.8%, n = 6,269. Family structure was categorized into traditional family, single-parent family and reconstructed family. Irregular breakfast habits (IBH) were defined as having breakfast 0-1 times per week.

RESULTS: Analyses of the total population show an increased, significant odds ratio (OR) of 1.56 for IBH among children from single-parent families. Among children from reconstructed families, an insignificant OR of 1.27 was observed. Further, the results suggest that girls living in a reconstructed family may also have an increased risk of IBH.

CONCLUSION: The breakfast habits of adolescent boys and girls are influenced by family structure.

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Regular breakfast habits are important for the health and well-being of children and adolescents. Regular breakfast habits are associated with healthy eating patterns characterised by ingestion of recommended levels of nutrients [1-3] and increased academic achievement [1, 4]. Irregular breakfast habits (IBH), on the other hand, are associated with overweight among children and adolescents [2, 5, 6]. The family setting constitutes an important setting for ensuring healthy breakfast habits and it is therefore relevant to study the influence of family structure on the frequency of breakfast skipping.

Breakfast is frequently skipped by children and adolescents [1]. A Danish survey from 1996-97 among students in grades 8 and 9 showed that 19% of the boys and 32% of the girls did not have breakfast every school day [7]. Another Danish study from 2006 showed that ten years later, the proportion of students in grade 9 who did not have breakfast every school day was 43% among girls and 31% among boys [8]. Especially older girls and children from families of low socioeconomic position are at increased risk of IBH [1, 2, 9]. Trend analyses from the US show a marked increase in the prevalence of children and adolescents with IBH [10].

An international review collected evidence on the influence of family factors on children's and adolescents' breakfast habits [11]. Five studies, of which one is Danish [7], specifically analysed the influence of family structure. Despite variations in measurements of both family structure and IBH, four of the five studies found the lowest risk of IBH among children living with both their parents. The same observation was made in a recent American study [12]. Results from the Health Behaviour in School-aged Children study show that in the majority of the 41 participating countries (barring Eastern countries), living in a single-parent family is associated with an increased risk of IBH [13]. No former studies have evaluated whether the influence of family structure on breakfast habits vary with gender.

The objectives of the present study are to study the association between family structure and the regularity

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of breakfast habits among children and adolescents, and to analyse whether such potential association is modified by gender.

MATERIAL AND METHODS

Design, study population and data collection

The paper reports data from the Danish contribution to the international research project Health Behaviour in School-aged Children (HBSC) in 2006. The overall aim of the study is to enhance the understanding of young people's health, health behaviours and well-being in their social setting [14]. The study design is a series of cross-sectional surveys of 11-, 13-, and 15-year-old students (corresponding to grades 5, 7 and 9 in Denmark) from a random sample of schools. The surveys are conducted every four years. Data were collected by a standardised questionnaire completed in the classroom [14, 15].

From a complete list of public and private elementary schools in Denmark, 100 schools were randomly selected. Eighty schools with 375 school classes agreed to participate. A total of 6,269 students returned completed questionnaires corresponding to 88.8% of all stu-

dents enrolled in the 375 classes and 98.8% of students present at the day of data collection. The mean age of students in grades 5, 7 and 9 was 11.6, 13.6 and 15.6 years, respectively.

There is no formal agency for ethical assessment and approval of questionnaire-based population studies in Denmark. We therefore obtained an ethical approval from each school's board of parents, school director and the students' council. Further, students were directly informed that participation was voluntary and anonymous.

Measurements

The applied questionnaire has been continuously developed and tested in the international HBSC research network. Scientific rationales for each of the survey topics are developed and presented along with detailed item descriptions in an international research protocol that also includes results from validation studies. Most mandatory items have been qualitatively and quantitatively validated in most cases in several countries. All national questionnaires have been back-translated and checked by the international coordinating centre [14]. Also, in Denmark the full questionnaire is piloted prior to each data collection.

Family structure was based on students' reports on who they were living within the home where he/she lived all days or most days. Response categories were *mother, father, stepmother (or mother's boyfriend), stepfather (or father's girlfriend), grandmother, grandfather, foster home or children's home,* and *others.* The same question was asked for second homes. Family structure was categorised into traditional family (two biological parents), single-parent family (one single biological parent), reconstructed family (one biological parent + one stepparent) and other (e.g. living with grandparents). Children living in "other" family structures and children with missing responses on family structure were left out of the analyses.

The frequency of consuming breakfast was measured by the item: "On weekdays, how often do you usually have breakfast (more than a glass of milk or fruit juice)?" Response categories were *I never have breakfast during the week, one day, two days, three days, four days,* and *five days.* IBH was defined as having breakfast 0-1 weekday per week and regular breakfast habits was defined as 2-5 days per week. This cut-point was chosen in order to analyse high-risk breakfast habits.

Three covariates were included in the analysis: gender, age and family social class.

Data on family social class stem from three items about the father's and the mother's occupation: "1) Does your father (mother) have a job? 2) Please write where he (she) works. 3) Write exactly what kind

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TABLE 1

Characteristics of the study population according to age, frequency of breakfast, family structure and family social class by gender. The values are n (%).

	Total population (n = 6,269)	Girls (n = 3,187)	Boys (n = 3,082)
Age, years			
11	2,362 (37.7)	1,213 (38.0)	1,149 (37.3)
13	2,222 (35.4)	1,125 (35.3)	1,097 (35.6)
15	1,685 (26.9)	849 (26.6)	836 (27.1)
Frequency of breakfast, weekdays per week			
5	4,502 (71.8)	2,190 (68.7)	2,312 (75.0)
4	378 (6.0)	217 (6.8)	161 (5.2)
3	290 (4.6)	155 (4.9)	135 (4.4)
2	185 (3.0)	97 (3.0)	88 (2.9)
1	228 (3.6)	128 (4.0)	100 (3.2)
0	594 (9.5)	354 (11.1)	240 (7.8)
Missing	92 (1.5)	46 (1.4)	46 (1.5)
Family structure			
Traditional family	3,558 (56.8)	1,767 (55.4)	1,791 (58.1)
Single-parent family	1,189 (19.0)	604 (19.0)	585 (19.0)
Reconstructed family	664 (10.6)	355 (11.1)	309 (10.0)
Other	174 (2.8)	98 (3.1)	76 (2.5)
Missing	684 (10.9)	363 (11.4)	321 (10.4)
Family social class			
High (I+II)	1,391 (22.2)	677 (21.2)	714 (23.2)
Middle (III+IV)	2,501 (39.9)	1,318 (41.4)	1,183 (38.4)
Low (V+VI)	1,155 (18.4)	603 (19.9)	552 (17.9)
Unclassifiable	1,049 (16.7)	516 (16.2)	533 (17.3)
Missing	173 (2.8)	73 (2.3)	100 (3.2)

of work he (she) has (e.g. teacher, bus driver)". The information was coded into social class I (highest) to V according to the standards of the Danish National Institute of Social Research [16]. This standard is almost identical to the UK Registrar General's classification. This paper reports data about the social class of the highest ranking parent. We added social class VI to include economically inactive parents who receive transfer income. Furthermore, the category "unclassifiable" was added to describe parents who were economically active, but for whom we were not able to identify the exact job activity. Family social class was categorised into high (I+II), middle (III+IV), low (V+VI) and unclassifiable. Unclassifiable data were kept in a separate category to avoid loss of statistical power. Missing data were left out of the analyses.

Statistical analyses

Multiple logistic regression analyses were conducted in SAS version 9.1. All regression analyses were run by PROC GLIMMIX to account for the design effect caused by the cluster sampling approach. Separate inclusion of random effects of school and school class revealed nearly identical estimates, 95% confidence limits and p values. Analyses including the random effect of school are reported. First, we conducted an analysis of the association between family structure and IBH for the total study population adjusted for gender, age and family social class. Reference group (odds ratio (OR) = 1) was students living in traditional families. Second, the modifying effect of gender and age was tested by including interactions in the regression model. Finally, analyses stratified by gender were conducted. Analyses of non-respondents were conducted by comparing participants with and without responses on family structure in relation to gender, age, breakfast habits and family social class (chi-square test).

Trial registration: not relevant.

RESULTS

Relatively large proportions of Danish school children in grades 5, 7 and 9 never have breakfast on weekdays (9.5%) (**Table 1**) and IBH are more prevalent among girls than among boys (p < 0.001). For both boys and girls, the prevalence of IBH increases by increasing age (data not shown).

Analyses of the total population show an increased, significant OR of 1.56 for IBH among children from single-parent families. Among children from reconstructed families, an insignificant OR of 1.27 is observed. The p value for the statistical interaction between family structure and gender is p = 0.1039. Girls from single-parent families and girls from reconstructed families have ap-

📑 **TABLE 2**

Odds ratio (95% confidence limits) for irregular breakfast habits (0-1 weekdays per week) by family structure for the full population adjusted for gender, age and family social class. Also analyses stratified by gender are shown, adjusted by age and family social class.

	Total population (n = 6,269)	Girls (n = 3,187)	Boys (n = 3,082)
Family structure			
Traditional family	1.0	1.0	1.0
Single-parent family	1.56 (1.28-1.89)	1.37 (1.05-1.79)	1.77 (1.32-2.37)
Reconstructed family	1.27 (0.98-1.63)	1.45 (1.05-1.99)	1.01 (0.66-1.54)
Gender			
Boys	1.0	–	–
Girls	1.45 (1.23-1.72)	–	–
Age, years			
11	1.0	1.0	1.0
13	1.64 (1.33-2.02)	1.99 (1.50-2.63)	1.30 (0.95-1.79)
15 years	2.44 (1.97-3.03)	2.80 (2.09-3.73)	2.01 (1.46-2.78)
Family social class			
High: I+II	1.0	1.0	1.0
Middle: III+IV	1.31 (1.03-1.68)	1.06 (0.77-1.45)	1.83 (1.23-2.72)
Low: V+VI	1.65 (1.25-2.16)	1.59 (1.23-2.25)	1.99 (1.28-3.11)
Unclassifiable	1.79 (1.36-2.37)	1.49 (1.04-2.15)	2.49 (1.61-3.84)

proximately the same significant OR for IBH (OR = 1.45 and 1.37, respectively). Boys living in single-parent families have a significantly increased OR for having IBH (OR = 1.77). No differences are observed for boys in reconstructed families compared with boys living in traditional families (OR = 1.01) (**Table 2**). The statistical interactions between family structure and age are insignificant, both in the total population (p = 0.9752) and among boys (p = 0.7428) and girls (p = 0.7635).

Table 2 also presents the main effect of the included covariates. Significantly increased ORs for IBH are seen among girls compared with boys, among 13- and 15-year-old students compared with 11-year-old students, and the OR for IBH increases in a stepwise fashion with increasing family social class. The p value for the statistical interaction between age and gender is 0.0613 which indicates that the association between age and IBH is stronger among girls than among boys.

Table 3 presents the distribution of students with missing data on family structure by breakfast habits, gender, age and family social class. Older students are significantly over-represented among students with missing values on family structure (p < 0.0001).

DISCUSSION

More girls than boys skip breakfast. Children living in single-parent families have an increased OR for IBH. Further, the results suggest that also girls living in a reconstructed family have an increased risk of IBH.

Our findings of an increased risk of IBH when not living in a traditional family correspond to former results

TABLE 3

Distribution of non-respondents on family structure by breakfast habits, gender, age and family social class.

Family structure	Respondents, n (%) (n = 5,585)	Non-respondents, n (%) (n = 684)	p value
Breakfast habits			0.5180
Irregular breakfast habits, 0-1 weekdays per week	728 (88.6)	94 (11.4)	
Regular breakfast habits	4,778 (89.2)	577 (10.8)	
Missing	79 (85.9)	13 (14.1)	
Gender			0.2159
Girls	2,824 (89.6)	363 (11.4)	
Boys	2,761 (88.6)	321 (10.4)	
Age			< 0.0001
11 years	2,199 (93.1)	163 (6.9)	
13 years	1,981 (89.2)	241 (10.8)	
15 years	1,405 (83.4)	280 (16.6)	
Family social class			0.6783
High: I+II	1,240 (89.1)	151 (10.9)	
Middle: III+IV	2,213 (88.5)	288 (11.5)	
Low: V+VI	1,031 (89.3)	124 (10.7)	
Unclassifiable	946 (90.2)	103 (9.8)	
Missing	155 (89.6)	18 (10.4)	

[11-13]. A number of family-related factors may influence dietary habits of adolescents. These factors include the presence of parents, parental dietary behaviour and meal patterns, parental encouragement, having family meals and parenting style [e.g. 11, 17]. Such factors may be unevenly distributed across the various types of family structures and may thereby contribute to the observed association between family structure and breakfast habits. Our results indicate that living in a reconstructed family also involves a risk of IBH among girls. The reason behind this finding can only be hypothesised. It may be that girls and boys have different reasons for skipping breakfast (e.g. dieting behaviours) and that these may relate differently to family structure. Clearly, there is a need for more research to enlighten the underlying mechanisms behind the association between family structure and IBH, including gender-specific issues. Initially, such research should be conducted by a qualitative methodology supported by quantitative data collection.

The presented results must be evaluated against the applied methods. The analyses are conducted on a nationally representative sample characterised by a high response rate. Selection bias at the school level is probably minimal as it is not to be expected that schools that chose not to participate are characterised by special patterns of student breakfast habits or family structure. At the individual level, there is a risk that students absent on the day of data collection are characterised by IBH and/or non-traditional family structure. In such case the presented associations may be underestimated. Some selection bias may also occur in the analyses as older students are significantly over-represented among students with missing values on family structure.

The applied data are based on self-reports which introduces a risk of information bias. Many children live in changing constructs of family structure; and collecting data on the full complexity of these constructs is difficult. As expected, the variable family structure is characterised by a significant proportion of missing data. The three applied categories of family structure we expect to be unproblematic. Including more complicated family structures is not possible on the basis of the available data.

The validity of self-reported breakfast habits is unknown. One obstacle may be associated with the difficulties in defining a real breakfast meal. Still, national pilot studies have not identified such problems. The crude categorization of regularity of breakfast habits introduces a risk of overlooking facets of the analysed association. However, the aim of the present study is to study definite risk behaviour. Regarding the measure of family social class, studies from Norway [18], Scotland [19] and Denmark [20] have documented that children and adolescents aged 11 to 15 are able to report reliable data on their parents' occupation.

Potential residual confounders may be weight status and physical activity. However, these confounders may also constitute intermediary factors between family structure and breakfast habits. Adjusting for weight status and physical activity therefore implies a risk of over-controlling.

The evidence on the influence of family structure on children's and adolescents' breakfast habits is limited and the presented analyses are the first to study the modifying effect of gender. As stated earlier, a next step will be to delineate the underlying mechanisms of the observed associations in more detail. Still, the results highlight the relevance of incorporating the importance of the family setting in health promotion initiatives targeting breakfast habits among children and adolescents.

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