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Gender differences in child-related and parent-related determinants of oral health-related lifestyle among 11- to 12-year-old Finnish schoolchildren

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Abstract

Objective. The aim of this study was to ascertain whether child-related and parent-related characteristics were associated differently with oral health-related lifestyle among boys and girls. ***Material and methods.*** The study population consisted of 5th and 6th graders and their parents in Pori, Finland. There were 1691 children ranging in age between 11 and 12 years. The data were gathered by questionnaires. For the analyses, we grouped children and parents within three lifestyle groups: favorable, moderate and poor. Differences in child-related and/or parent-related characteristics between boys and girls were analyzed with logistic regression analyses; those with a favorable lifestyle comprised the healthy lifestyle group, and those with a moderate or poor lifestyle the unhealthy lifestyle group. ***Results.*** Oral health-related lifestyle was healthy more often among girls than among boys. In both genders, those who considered toothbrushing important for pleasing authorities more often had a healthy lifestyle. Girls who considered toothbrushing important for health and appearance were more likely to have a healthy lifestyle than those who did not. The effect of parents' oral health-related lifestyle was slightly stronger among boys than among girls. Among girls, however, high occupational level of father was indicative of healthy lifestyle. ***Conclusions.*** Among girls and boys, there are similarities and differences in factors related to oral health-related lifestyle. The parents' model is important for both, but the effect is stronger among boys than among girls. Among girls, attitudes on health and appearance are positively associated with a health-related lifestyle.

Key Words: *Attitude, behavior, boy, girl, knowledge*

Introduction

The oral health-related lifestyles of women and men differ. Women brush their teeth more often than men at least twice a day and use fluorides more often than men do [1–3]. There are differences between boys and girls, too. Girls tend to brush their teeth more often and to eat sweets less frequently than boys do [4–7].

Knowledge, attitudes, and beliefs have been suggested to precede health behavior [8]. Freeman et al. [9] and Östberg et al. [10] have reported that among girls the level of oral health-related knowledge is higher than among boys. The attitudes of girls towards oral-health-promoting habits have also been found to be more favorable than those of boys [9,10].

Family characteristics are associated with children's oral health behavior. Children of parents who have favorable attitudes towards controlling their children's toothbrushing and sugar-snacking habits more often have favorable oral health habits than do children of parents with unfavorable attitudes [11]. Parents' oral hygiene habits influence on their children's corresponding behavior [12,13]. Similarities between parents and their children have also been found in the use of non-sugared mineral water [13]. The socio-economic situation of the family seems to be associated with children's oral health behavior. Adolescents whose parents are highly educated tend to brush their teeth more often than those whose parents are less educated [14]. Also, mother's occupational level seems to have a bearing on children's oral health-related behavior [15].

In the early 1990s, Wickrama et al. [16] explored adolescents' and their parents' health-related lifestyle and found differences between boys and girls in

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intergenerational transmission of health-risk behaviors. Fathers' health-risk lifestyle affected mainly that of boys, while mothers' health-risk lifestyle affected mainly that of girls. We found no studies evaluating possible gender differences in the effect of family characteristics and parent-related factors on children's oral health-related lifestyle. In Pori, Finland, we have been studying oral health-related knowledge, attitudes, beliefs, and behaviors among 11- to 12-year-old schoolchildren and their parents [15,17] and have found that girls are more likely than boys to have a favorable oral health-related lifestyle [17]. The specific aim of the present study was to ascertain whether child-related or parent-related characteristics were associated differently with oral health-related lifestyle among boys and girls.

Material and methods

Study sample and measurements

The study was conducted in Pori, Finland. The census-based sample consisted of all 5th and 6th graders, except for mentally disabled and handicapped children attending special schools, and one of their parents. At the beginning of the school year 2001–2002, the children were aged between 11 and 12 years and the number of eligible participants was 1691. The data were gathered from the children and parents by questionnaires that included structured and open-ended questions concerning oral health-related knowledge, attitudes, beliefs, and behaviors. Belief in keeping one's own teeth was measured using a 3-point Likert-scale question, the alternatives being: "yes", "I do not know", and "no". Knowledge and attitudes were measured with questions to be answered on a 4-point Likert scale, the alternatives being: "strongly agree", "partly agree", "partly disagree", and "strongly disagree". Behaviors were measured using 7-point Likert-scale questions concerning the frequency of the behavior. The parents' questionnaire included questions about the occupations of both the mother and father of the child. The details of the study design have been described previously [15,17].

In November 2001, oral health personnel administered the questionnaires to pupils to be filled out at school. The pupils took a questionnaire to one of their parents to be filled out at home. Family members agreed among themselves which of the caretakers was to fill out the questionnaire. The children returned the parents' questionnaires in sealed envelopes to school. Completed questionnaires were received from 1649 children and 1523 parents. The number of eligible parent–child pairs was 1512, comprising 742 (49%) girls and 770 boys (51%). Among the parents, the percentages of mothers and fathers/other caregivers were 88 and 12, respectively. There were 7 other caregivers, 5 of whom were grandparents. Because of the low number of "other caregivers", we included them in the same group as the fathers.

For the analyses, we first grouped children and parents into three lifestyle groups: favorable, moderate, and poor. Favorable lifestyle consisted of at least three of the following behaviors: brushing the teeth with fluoride toothpaste at least twice a day, snacking on sweets no more than once a week, drinking soft drinks no more than 2–3 times per week, and using xylitol products (xylitol chewing gum and/or xylitol lozenges) at least twice a day. If at least three of these behaviors were poorer than the recommendations, the respondent was assigned to the poor lifestyle group. The remaining respondents made up the moderate lifestyle group.

Statistical analyses

To reduce the number of variables for the analyses, explorative factor analysis with varimax rotation was performed for questions concerning the knowledge and attitudes of the children and their parents. Factors were extracted using principal component analysis with an eigenvalue >1 as cut-off point. Eleven factors, explaining 60.9% of the common variance, were revealed. These included six factors concerning children's attitudes and knowledge and five factors concerning parents' attitudes and knowledge. The threshold for a single item to be included in a factor was 0.49. This threshold was chosen in order to obtain factors such that no item would load into two factors. The single items were first dichotomized to represent favorable ($=1$) or unfavorable ($=0$) attitude or knowledge. Sums for dichotomized items were calculated for each factor. The sum scores were then dichotomized for further analyses as favorable $=1$ or unfavorable $=0$. Belief in keeping one's own teeth was dichotomized as yes $=1$ and no/I do not know $=0$. Bivariate associations between the child's gender and oral health-related lifestyle group, oral health-related habits, belief in keeping one's own teeth throughout life, number of siblings, child's knowledge of parent's dental health, parent's occupational level, parent's oral health-related lifestyle, parent's self-assessed dental health and 11 factors comprising children's and parents' oral health-related knowledge and attitudes were analyzed using cross-tabulations. Chi-square tests were used for statistical evaluation of the observed differences.

In the next step, we explored whether there were child-related and/or parent-related characteristics that were associated differently with oral health-related lifestyle among girls and boys. Two logistic regression models were constructed; the first included child-related characteristics, while the other contained parent-related characteristics. The dependent variable was the child's oral health-related

lifestyle. Those with a favorable lifestyle made up the healthy lifestyle group (=1) and those with moderate or poor lifestyle made up the unhealthy lifestyle group (=0). The dichotomized (0/1) child-related variables were the child's belief in keeping his/her own teeth throughout life (yes=1), child's knowledge of oral health-related items (good=1) and five factors concerning the child's attitudes (positive =1). The parent-related variables were mother's occupational level (highly skilled occupation level =1), father's occupational level (highly skilled occupation level=1), number of siblings (one or more siblings=1), parent's self-assessed dental health (good=1), parent's oral health-related lifestyle (healthy=1), parent's knowledge of oral health-related items (good=1), four factors concerning parent's attitudes (positive=1), respondent (father=1, mother=0) and child's reply to the question: Does your mother/father have cavities in her/his teeth (yes or no=1, I do not know=0). The child's gender (girl=1, boy=0) was included in both models. The initial models were complete models that included all child-related or parent-related independent variables. To determine whether the effect of independent variables on child's lifestyle differed between boys and girls, we included interaction terms with the child's gender. We then proceeded with the manual backward-elimination method, excluding interaction terms for which the regression coefficient did not reach a significance level of $p<0.05$. The main effects for which the regression coefficient did not reach $p<0.05$, or that were not part of an interaction term included in the model, were then eliminated. In the final models, however, the odds ratios (OR) and their 95% confidence intervals (CI) were calculated separately for boys and girls. We aimed at models that were parsimonious and that fitted sufficiently well. Statistical analyses were conducted using SPSS 14.0 and SAS 9.1.

Ethical aspects

The Ethics Committee of the Northern Ostrobothnia Hospital District and the City of Pori gave their approval for the study.

Results

In total, 89% of the children in the sample and their parents completed their questionnaire adequately for use in the analyses. Among respondents eligible for the analyses, on average 2.5% item-specific values were missing for children and 1.4% for parents. Oral health-related lifestyle was favorable more often among girls than among boys and among the parents of girls than among the parents of boys (Table I). Girls reported brushing their teeth more often and consuming soft drinks less often than boys did (61% versus 43% ($p<0.001$) and 77% versus 68% ($p<0.001$)). Sweet snacking once a week or less often was equally frequent among girls and boys (46%). However, daily consumption of sweets was clearly more frequent among boys than among girls (26% versus 18% ($p<0.001$)). The occupational level of the mother was high more often among boys than among girls (37% versus 30% ($p=0.003$)), and the self-assessed dental health of the responding parent was good more often among boys than among girls (39% versus 32% ($p=0.002$)) (data not shown in the tables).

Table II presents the percentages of girls and boys according to the 11 attitude/knowledge factors explaining 60.9 of the variance in the factor analysis. Girls were more often distressed about getting caries than boys were and more often considered toothbrushing important than boys did. Girls' parents considered toothbrushing important for pleasing one's mate and child more often than boys' parents did (Table II).

When single attitude variables were examined, it was found that among boys there were more respondents who considered toothbrushing important for pleasing parents than among girls (58% versus 45% ($p<0.001$)). In everyday situations, 39% of the girls considered toothbrushing important when going to school, whereas the corresponding percentage for boys was 23. As for non-daily occasions, when going to a discotheque toothbrushing was important for 59% of the girls and for 48% of the boys; and when visiting a dentist it was important for 84% of the girls and for 74% of the boys. All the above differences were statistically significant at the $p<0.001$ level (data not shown in the tables).

Among girls, considering toothbrushing important for health and appearance was positively associated with oral health-related lifestyle; but among boys, no such association was found (Table III). Among both girls and boys, considering toothbrushing important for pleasing authorities and good knowledge about oral health-related items was associated with oral health-related lifestyle. Those who believed in keeping their own teeth throughout life were more likely to have a healthy lifestyle than those who did not believe in this, but among boys this effect was not statistically significant (Table III).

For both girls and boys, parents' oral health-related lifestyle was positively associated with lifestyle, and the effect was slightly stronger among boys than among girls (Table IV). High occupational level of the father was indicative of girls', but not of boys', healthy lifestyle. Girls and boys who had siblings were more likely to have a healthy lifestyle than those who had no siblings (Table IV). Boys whose fathers had filled out the questionnaire were more likely to have a healthy lifestyle than those whose mothers were the respondents. However, the difference between boys and girls was not statistically

Table I. Distribution of respondents according to oral health-related lifestyle and child's gender

	Total *n* (%)	Girls *n* (%)	Boys *n* (%)	*p*-value
Child's oral health-related lifestyle				<0.001
Favorable	425 (28)	265 (36)	160 (21)	
Moderate	666 (44)	300 (40)	366 (47)	
Poor	421 (28)	177 (24)	244 (32)	
Parent's oral health-related lifestyle				<0.001
Favorable	621 (41)	349 (47)	272 (35)	
Moderate	639 (42)	297 (40)	342 (45)	
Poor	252 (17)	96 (13)	156 (20)	

significant. Among both girls and boys, those who reported that their parent has or does not have cavities were more likely to have a healthy lifestyle than those who reported that they did not know about their parent's dental health. This effect was statistically significant ($p < 0.005$) only when the data for girls and boys were pooled (data not shown in the tables).

Discussion

When studying health behavior, it is important to acquire an understanding of social, economic, belief, and attitudinal factors [18]. It is well known that the health-related habits of girls and boys tend to be different, but information on factors related to boys' and girls' behavior is scarce. For health-promotion actions, more understanding is needed about the factors that may help individuals from different backgrounds to adopt a healthy lifestyle and the factors that may hinder it [18].

The school-based approach used to collect data contributed to the high rates of participation. Children and parents gave their responses individually, children at schools and parents at home. Thus, measurement of oral health behaviors was likely to be more valid than it would if children had reported for their parents or vice versa. The children had been instructed to give the parent's questionnaire to one of their parents and it seems that the mother was most often chosen as the one to reply to the questions. Irrespective of the responding parent, data of both parents' occupational levels were available. However, the high percentage of mothers among the responding parents may have influenced the results of parents' behaviors because women's health habits have been reported to be more favorable than those of men [1]. Anyhow, the results call for further studies on the influence of fathers and mothers in their children's health-related behavior. The results support earlier findings about gender differences in health behaviors. Girls more often reported having favorable habits than boys did. According to their self-reported behaviors, girls' parents belonged to the favorable lifestyle group more often than boys' parents did.

Of the child-related factors, considering toothbrushing important for pleasing authorities had the strongest effect on oral health-related lifestyle among both genders. The factor "Authorities" included variables such as importance of toothbrushing when going to school, importance of toothbrushing when going to a dentist, importance of toothbrushing when going to sports/hobbies, and knowledge of the statement "A person has to brush her/his teeth twice a day" [19]. Knowledge of health-related items had a lesser effect on lifestyle than attitudes did and the difference between genders was not statistically significant. In a systematic review of the effectiveness of oral health promotion, Kay & Locker [20] found that health education is effective in increasing level of knowledge and in altering

Table II. Percentages of girls and boys according to oral health-related knowledge and factors describing the attitudes of the respondents

	Girls %	Boys %	*p*-value
Child-related factors			
For children, toothbrushing is important for health and appearance	93	88	0.001
For children, toothbrushing is important when going to social functions	91	89	0.167
For children, toothbrushing is important for pleasing authorities	91	77	<0.001
Child is distressed about getting caries	81	74	0.001
Children's knowledge of oral health-related items is good	63	60	0.225
For children, toothbrushing is important for pleasing parents and friends	60	60	0.915
Parent-related factors			
For parents, toothbrushing is important when going to social functions	92	93	0.864
For parents, toothbrushing is important for health and appearance	86	86	0.942
Parent is distressed about getting caries	86	84	0.410
For parents, toothbrushing is important for pleasing one's mate and child	86	79	<0.001
Parents' knowledge of oral health-related items is good	77	74	0.222

Table III. Summary of the results of the final logistic regression analysis exploring the effect of child-related factors among 11- to 12-year -old boys and girls using oral health-related lifestyle (1 =healthy, 0 =unhealthy) as dependent variable. Independent variables were child's belief in keeping her/his own teeth throughout life and the child's attitude and knowledge factors, in interaction with her/his gender

Variable and coding	Crude OR	OR	95% CI	*p*-value for the difference between boys and girls
Child considers toothbrushing important for pleasing authorities (1 =yes, 0 =no)				0.508
Among girls	5.26	3.86	1.60–9.30	
Among boys	7.09	5.71	2.66–12.26	
Child considers toothbrushing important for health and appearance (1 =yes, 0 =no)				0.030
Among girls	4.33	2.65	1.07–6.53	
Among boys	1.65	0.74	0.36–1.51	
Child's oral health-related knowledge (1 =good, 0 =poor)				0.401
Among girls	1.94	1.65	1.15–2.36	
Among boys	2.48	2.09	1.36–3.22	
Child believes in keeping his/her own teeth throughout life (1 =yes, 0 =no)				0.599
Among girls	1.89	1.65	1.19–2.30	
Among boys	1.61	1.44	0.97–2.13	

attitudes and beliefs. However, there was no clear evidence that changes in knowledge, attitudes, and beliefs were related to a change in oral health habits [20]. Health-promotion programs organized at schools can be effective, but more research is needed to determine which methods work and which do not [21]. When oral health promotion is implemented among schoolchildren, it is important to make a plan for giving information, but also for giving children adult support.

Among girls, those who considered toothbrushing important for health and appearance more often had a healthy lifestyle than those who did not. This is in agreement with the findings of Freeman et al. [9], who reported that girls attributed great importance to self care more often than boys did. When oral

Table IV. Summary of the results of the final logistic regression analysis exploring the effect of parent-related factors among 11- to 12-year old boys and girls using oral health-related lifestyle (1 =healthy, 0 =unhealthy) as dependent variable. Independent variables were parent's occupational level, number of siblings, respondent, parent's self-assessed dental health, parent's oral health-related lifestyle, child's reply to the question: Does your mother/father have cavities in her/his teeth, and five parental attitude and knowledge factors, in interaction with child's gender

Variable and coding	Crude OR	OR	95% CI	*p*-value for the difference between boys and girls
Parent's oral health-related lifestyle (1 =healthy, 0 =unhealthy)				0.028
Among girls	4.79	4.87	3.47–6.83	
Among boys	8.32	8.89	5.87–13.45	
Occupational level of father (1 =high level, 0 =low level)				0.007
Among girls	1.74	1.69	1.18–2.41	
Among boys	0.98	0.79	0.52–1.20	
Number of siblings (1 =at least one sibling, 0 =no siblings)				0.961
Among girls	1.67	1.83	1.11–3.01	
Among boys	1.70	1.87	1.08–3.23	
Respondent (1 =father, 0 =mother)				0.100
Among girls	0.91	1.13	0.65–1.94	
Among boys	1.51	2.18	1.24–3.82	
Child's reply to the question: Does your mother/father have cavities in her/his teeth (1 =yes or no, 0 =I don't know)				0.562
Among girls	1.33	1.23	0.87–1.72	
Among boys	1.37	1.44	0.95–2.17	

health promotion is implemented among schoolchildren, it is useful to educate girls by teaching about items related to health and by motivating them with factors related to appearance. However, it is important to balance the message between health and appearance, which is a strong trend in today's society. Östberg et al. [22] found that girls are more often dissatisfied with the appearance of their teeth than boys are. Among boys, those who are satisfied with the appearance of their teeth more often perceive sound teeth important than those who are not satisfied. Also, boys who are satisfied with the appearance of their teeth have more favorable oral hygiene and sweet-consuming habits than boys who are not [22].

Of the parental factors, the favorable model of the parent was a major contributor to healthy oral health-related lifestyle among both girls and boys. The influence of the parental model, however, was stronger among boys than among girls. Among girls, those whose father's occupational level was high more often had a healthy oral health-related lifestyle than did those whose father's occupational level was low. Östberg et al. [23] found that family characteristics were important for adolescents' self-perceived oral health, but there were only a few and minor differences between genders in the parental employment status. Among boys, the presence of the father in the child's life, which in our study appeared as the father responding to the survey, seemed to contribute to the adoption of a healthy lifestyle. Earlier studies have suggested that parents' health habits and parenting style are associated with children's dental health [24]. The results of this study further emphasize the importance of the parents', both mothers' and fathers', model of oral health behavior for the children. Among both girls and boys, those who had siblings were more likely to have a healthy lifestyle than those who did not have siblings. Nicolau et al. [25] found that according to birth order, second or later children were more likely to have decayed, missed and/or filled teeth than first children were. Results from the Norwegian National Health Survey 1985 [26] suggested that the older sibling's interdental cleaning behavior had a substantial influence on that of a younger sibling. In this study, however, we did not ask the birth order of the child. Our results may indicate the influence of a positive model of siblings or other characteristics of the family. A child's knowledge about her/his parents' dental health was positively associated with lifestyle. We suggest that awareness of each other's oral health within a family indicates that health-related items are discussed among the family, which is likely to contribute to the adoption of a healthy lifestyle among the children.

In conclusion, there are similarities and differences among girls and boys in factors related to oral health-related lifestyle. The parents' model is extremely important in both genders, but the effect is slightly stronger among boys than among girls. For both girls and boys, considering toothbrushing important for authorities is indicative of a healthy lifestyle. Among girls, attitudes on health and appearance are positively associated with a health-related lifestyle. In adopting a healthy oral health-related lifestyle, both the mother and the father of the child seem to play an important role, which calls for further studies.

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