ajfand SCHOLARLY, PEER REVIEWED
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
Volume 13 No. 2
April 2013
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

CORRELATION BETWEEN CARIES EXPERIENCE IN SUDANESE SCHOOL CHILDREN AND DIETARY HABITS, ACCORDING TO A FOOD FREQUENCY QUESTIONNAIRE AND A MODIFIED 24-HR RECALL METHOD

Nazik MN[1], Malde MK[2], Ahmed MF [3] and TA Trovik[4]

Nazik Nurelhuda

*Corresponding author email : n.nurelhuda@hotmail.co.uk

[1]Division of Dental Public Health, Faculty of Dentistry, University of Khartoum, Sudan

[2] National Institute of Nutrition and Seafood Research (NIFES) Bergen, Norway

[3]Glasgow Dental Hospital and School, Glasgow, UK

[4] Department of Clinical Dentistry - University of Tromsø, Norway

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ABSTRACT

World-wide epidemiological studies have found positive correlations between sugar-sweetened snack intake and dental caries in developing countries and the contrary in developed countries. The pattern of sugar-sweetened snack intake and the magnitude of its effect on the prevalence of dental caries differs from one population to another rendering it important to study each situation separately. In Sudan, to the best of our knowledge, the relation between dietary habits and oral health has not been reported previously, with the exception of a single study by Emslie, in 1966. The aims of this study among 12-year-old public and private school attendees in Khartoum were to test the hypothesis that the frequency of intake of sugar-sweetened snacks and beverages is associated with caries experience and socio-demographics, using a Food Frequency Questionnaire (FFQ) and Food Behaviour Checklist (FBC). A school-based survey was conducted among the 12-year-old school children of Khartoum state. Data was collected through face to face interviewer administered questionnaires. Decayed, Missing and Filled teeth (DMFT) index was measured using WHO criteria. No significant association was found between the total frequency of intake of the listed sugar-sweetened items and caries experience (DMFT >0 n=298). The 7 food items were inserted in a multiple variable logistic regression model (Nagelkerke 0.026]) alongside the socio-demographic variables with the Higher caries Experience Group as the dependent, and the soft drinks demonstrated a statistically significant association (OR 1.5 95% CI [1.0 – 2.4]). The hypothesis that the frequency of intake of sugar-sweetened snacks or beverages is associated with caries experience and socio-demographics in Khartoum 12-year-old school children is accepted in the higher caries experience group in that the high consumption of soft drinks was found to be a risk indicator for dental caries. School health promotion programs should be established, with the common risk factor approach in mind, thus, addressing the risk factor of poor dietary habits, which is common to many chronic conditions within a wider context.

Key words: Sudan, Caries, Dietary habits, Risk

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INTRODUCTION

Sucrose has been described as 'the arch criminal of dental caries' [1]. It has probably received attention more than any other factor in caries aetiology research. There is convincing evidence from animal experiments, human and experimental studies on the cariogenic potential of carbohydrates especially sugars [2]. The intervention by the classic Vipeholm study, although controversial, may be one well-known research project in an adult mental institution (1945 – 1953) concluding that the frequency and nature of sugar intake had marked influence on caries activity [3]. It also noted that dental caries experience showed wide individual variation. Another intervention study was the Turku study in Finland in the 1970s, where a massive reduction of the caries increment was found when sucrose and fructose consumption was replaced with xylitol [4].

World-wide, epidemiological studies have found positive correlations between sugar-sweetened snack intake and dental caries in developing countries and the contrary in developed countries [5, 6]. Studies have investigated individual intake in terms of frequency and have presented various association levels [7, 8]. When good oral hygiene is maintained and fluoride is supplied frequently, teeth will remain intact even if sugared foods are frequently eaten [9]. Thus, the pattern of sugar-sweetened snack intake and magnitude of its effect on the prevalence of dental caries differs from one population to another rendering it vital to study each setting separately. In Sudan, to the best of knowledge, the relation between dietary habits and oral health has not been reported previously, with the exception of a single study by Emslie, in 1966 [10]. The frequency of sugar consumption is expected to have risen since, due to the economic boost. Findings on the individual frequency intake of sugar-sweetened items may ultimately provide a feasible plan for the prevention of caries and emphasize the necessity of implementing oral health promotion programs focusing on dietary habits control.

Food consumption data are collected using a wide variety of methods and procedures. The most commonly used dietary data collection methods are 24 h recalls, self-administered food records and Food Frequency Questionnaires, which may be either interviewer or self-administered [11].

The 24-hour recall method is the most commonly used assessment tool in large cross-sectional surveys and skeletal development studies in both children and adults. Data collection of dietary habits from young children are generally challenging due to the 12-years-olds' limited cognitive ability to recall and record snacks and beverage intake and their knowledge of food and food preparation [12]. However, Livingstone and Robson found that from 8 years of age, there is a rapid increase in the ability of children to report food intake [13]. Multiple measures of the dietary consumption can be obtained to improve findings.

The aim of this study among 12-year-old public and private school attendees in Khartoum was to test the hypothesis that the frequency of intake of sugar-sweetened

snacks and beverages is associated with caries experience and socio-demographics, using a FFQ and a modified 24- hour recall questionnaire - Food Behaviour Checklist [FBC].

MATERIALS AND METHODS

Study population

A school-based survey was conducted from October 2007 to February 2008 among 12-year-old school children in all the 7 main localities of Khartoum state in Sudan [*Khartoum, JabalAwliya, Omdurman, Ombada, Karary, Bahry and SharqElNil*]. Sudan has an estimated population of 37.2 million with 37.6% living in urban areas. Khartoum, a mostly urbanized state, has 6.2 million citizens describing 16.7% of the Sudanese population [14]. A two-stage probability proportional to size cluster sampling technique was used, taking into consideration school sectors, the school density and gender distribution. A total of 1109 12-year-olds from 58 public and private schools were included in the study [50.2% public school attendees, 49.9% boys]. The gender distribution in the sample is similar to the represented population whereas the public to private student attendee ratio is in reality 7:1. For detailed description of the sampling procedures, see Nurelhuda *et al.* [15]. The results reported in this study are representative of all 12-year-old school children in Khartoum state.

Measurements

Clinical measurements

All the school children were clinically examined by one trained dentist [NMN, who was calibrated for the clinical examination at the University of Bergen- Norway, prior to the survey] under field conditions. Caries experience was assessed using the Decayed, Missing due to caries and Filled tooth index [DMFT] according to WHO caries diagnostic criteria for epidemiological studies [16]. Body Mass Index [BMI], defined as the weight in kg divided by the square of the height [m^2] was calculated. The weight was measured to the nearest 100g using a digital bathroom scale [950SV3R, Salter scales, UK]. The height was measured to the nearest centimetre using a metal pole and measuring tape. The school children were required to stand upright, keep their arms to the side and allow the heel, upper back and head to touch the wall against which the ruler was mounted as recommended by the WHO.

Socio demographics

The survey involved a questionnaire with the following variables: gender, age, locality and parental education. At the analysis level, fathers' and mothers' education was each grouped into higher [secondary and higher education] and lower education [primary schooling and below] and further combined into three groups; high [both parents higher education], middle [either one with higher education] and low [both parents with lower education]. Dichotomous indicators of socioeconomic status [SES] were reduced using principal component analysis to two categories :- middle and low SES [17]. For detailed description see Nurelhuda *et al*. [15].

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Sugar-sweetened snack intake
A pilot study was conducted with five school children, boys and girls, from two different schools to collect data on the common sugar-sweetened snacks and beverage items consumed by school children of that age. School children were interviewed using open-ended questions, by prompting questions about meal times and types of snacks. Based on these results, 4 snack items and 3 sweetened beverages were selected: sweet biscuits, chocolates, dessert and sweets; popsicles [coloured, flavoured ice confection], soft drinks, and sugar-sweetened hot beverages.

The instruments used included: 1- FFQ defined as a list of the 7 sugar sweetened snacks and beverages with 'frequency of intake' categories in a week [18], 2- Food behaviour checklist [FBC], a modified 3 day, pre-coded 24-hour-dietary recall prompting on the specific, pre-defined 7 items to ease the memory task and focusing on a defined time period [yesterday] for a total of three days [19].

Food Frequency Questionnaires focused on a general pattern where each child was interviewed individually and asked '*How often do you consume [snack item]*?' for each of the 7 items. The child was given the following possible answers to chose from: 1] more than once daily 2] once daily 3] 3-4 times a week 4] less than 3 times a week or never.

The short FBC interview was conducted by a trained teacher from every school who sat with each child privately in the classroom during working hours and was trained to ask them on each item the following question: '*Have you had [snack item] anytime yesterday? If yes,was it more than once?'* for the 7 items. This was not administered over weekends and the questions were not associated with special meal times. Both questionnaires were conducted after Ramadan [fasting month] to reduce bias.

Behaviour and attitude towards intake of sugar-sweetened snacks and beverage items
Tooth brushing habits were reported with respect to frequency: regular [everyday once or more, once every second day, once every third day, once a week] and irregular. The interview included additional questions on dietary behaviour: *Do you buy your sweets from school, shops in your neighbourhood or otherwise* [yes/no to each]? *Do your parents buy the sweets for you*[yes/no]? *Have your parents advised you on sugary snack eating pattern*[yes/no]? *What are your thoughts on sweet consumption*[They are bad for my teeth / they do not harm my teeth]?

Data Handling
Clinical variables: Since the prevalence of caries was skewed, caries experience was defined as school children with a DMFT more than 0 [n=298]. The proportion of subjects in this group with high DMFT was extremely low [DMFT > 5: 5 subjects], therefore, the higher caries experience *group* [HCEG] was defined as subjects with DMFT > 1. In accordance with the WHO classification of BMI-for-age percentile charts for boys and girls, an underweight child was defined as having BMI < 5% , a healthy child between 5% and 85%, those at risk of becoming overweight between 85% and 95% and overweight as having BMI > 95%.

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Food Frequency Questionnaire and *FBC:* Data from the FFQ and FBC was organised into two forms: continuous and grouped. The FFQ [n= 1109] scores [1, 2, 3 or 4] for the seven items were added to construct a continuous variable reporting a sum score for each individual – sum FFQ score [Range 0-24]. Furthermore, results were grouped into two as follows: *daily consumption* response [1] and *not daily consumption* response [0].

Similar to FFQ, the FBC scores from all the items [Range 0-3] were added to construct a continuous variable, the sum FBC score [Range 0-21]. The FBC data were grouped into frequent consumers who were those who consumed an item on all of the three days [=1] and non-frequent consumers who were those who reported on less than three days [=0].

Test – retest reliability
To test reliability, the consistency of a measure from one time to another, the FFQ questionnaire was reintroduced to 20 randomly selected school children from a single boys' school with a 10-day-interval period. Another 45 randomly chosen school children from this school were re-examined within 14 days for clinical examination reliability.

Statistical analyses
Analyses were carried out using SPSS 15.0 [SPSS Inc., 2006]. Frequencies, means and crude percentage agreement were computed for descriptive purposes. Stata version 10 [StataCorp LP, 2009] was used to adjust for cluster sampling, marking the strata as the locality, cluster as the school and the primary sampling unit and the unit of analysis being the schoolchild. Cohen's Kappa for was used test-retest reliability of FFQ [n=20] and DMFT [n=45], and Cronbach's alpha for internal consistency of the FFQ [n=1109] and FBC [n=1084].

The sum FFQ score was continuous and normally distributed. Student's t test and GLM ANOVA with Tukey's post hoc test were performed to evaluate if the bias was significantly different from zero. Bivariate and adjusted multivariate logistic regressions tests were employed to examine associations between the food items and the HCEG [n=1109]. The significance level for all analyses was $p<0.05$.

Ethical consideration
Procedures for obtaining consent and ensuring confidentiality were approved by the ethical research committees in the Sudan. Written permission to conduct the study was thus obtained from the authorities and informed consent obtained from the participants.

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RESULTS

The response rate was 99% for the FFQ questionnaire and 97% for the FBC.

Test-retest reliability - With regards to the reproducibility, Wilcoxon's signed rank test showed no statistically significant difference between the intake assessed at time 1 and time 2 for the frequency of each item on the FFQ. The Kappa-values ranged from -0.03 to 0.89 [sugar-sweetened hot beverage, chocolates][Table 1]. The intra-examiner Cohen's Kappa index was 0.83.

Internal consistency - Cronbach's alpha of the FFQ and FBC [n=1109] was 0.50 for both instruments.

Clinical profile

The overall prevalence DMFT rate of 12-year-old school children was found to be 0.42 [SD 0.92] and among subjects with higher caries experience it was 1.8 [SD 1.35]. The DMFT range was from 1 – 15; 53% had DMFT=1, 30% had DMFT = 2; and 1.6% had DMFT > 5. According to school sector, the DMFT was 0.40 [SD 0.92] among public school attendees and 0.57 [SD 1.19] among private school attendees. Body Mass Index calculations showed the representative prevalence as follows: underweight school children [35.8%], healthy children [55.8%], those at risk of becoming overweight [5.2%] and those overweight [3.5%].

Report on intake of sugar-sweetened snacks and beverage items

Representative FFQ results, weighted according to sector [public/private proportion = 7:1], show that school children consumed, on daily basis, soft drinks [80.6%] and chocolates [80.0%] followed by dessert [69.3%], sweet biscuits [65.3%], popsicles [61.4%], sweets [48.7%] and sugar-sweetened hot beverages [13.3%]. Private school attendees reported a significantly [$p<0.05$] higher consumption of chocolates [25% vs. 19%] and soft drinks [51% vs. 15%]. Underweight school children reported more frequent daily consumption of soft drinks [OR 2.1, $p<0.05$] and chocolates [OR 1.6, $p<0.05$] compared to the rest of the school children.

Representative FBC results, weighted according to sector [public/private proportion = 7:1], show that school children consumed at least 3 times in a week, hot drinks [73.2%] and popsicles [25.3%] followed by sweet biscuits [23.8%], sweets [18.3%], dessert [11.7%], soft drinks [11.5%] and chocolates [10.3%]. Private school attendees reported a significantly [$p<0.05$] higher consumption of soft drinks [36.6% vs. 8.1%] and chocolates [16.3% vs. 9.5%]. Public school attendees reported a higher consumption of sweet biscuits [24.4% vs 18.8%], popsicles [27.3% vs 10.7%], and hot drinks [75.8% vs 54%]. Underweight school children reported less frequent daily consumption of soft drinks [OR 2.0, $p<0.05$] and higher consumption of hot drinks [OR 2.2, $p<0.05$] compared to the rest of the school children. There was a low inter-individual variance in the mean consumption of food items on both questionnaires.

A GLM one-way between groups analysis of variance was conducted to explore the association between the independent socio-demographic and clinical variables and the continuous variables sum FFQ score and sum FBC score. The following variables were tested individually with the independent outcomes, and only those that showed a statistically significant association were inserted in the multiple variable ANOVA model: SES, school sector, gender, parental education, locality, caries experience and BMI.

Having sum FFQ score [mean 20.0, SD 3.5] as the dependent variable and SES, parental education and locality as fixed factors revealed statistically significant effects of locality [F=3.2, d.f.= 6, p=0.004] and SES [F=4.0, d.f. = 1, p=0.46] with no statistically significant interaction between the variables. However, the effect size was small [<0.02] for both. Post-hoc comparisons using the Tukey HSD test indicated that mean consumption on SharqElnil locality was higher than that in Khartoum and Ombada, and that in Bahri was higher than in Khartoum locality.

Similarly, having sum FBC score [mean, SD] as the dependent variable and school sector, locality, SES and parental education as fixed factors revealed statistically significant effects of SES [F=13.9, d.f. 1, p<0.001] with a small effect size, and significant interaction between SES and the other variables.

With regard to the HCEG [*DMFT > 1]* bivariate analysis showed that school children belonging to this group were 1.5 times more likely to report a daily consumption of popsicles [FFQ] compared to their counterpart. No significant associations were found otherwise [Table 2]. However, when all these were inserted in a multiple variable logistic regression model [Nagelkerke 0.015] there was no significant association with the outcome.

Reading the FBC reports, HCEG was associated with consumption of soft drinks, and popsicles on the three days. The 7 food items were inserted in a multiple variable logistic regression model [Nagelkerke 0.026] alongside the socio-demographic variables where the soft drinks demonstrated a statistically significant association [OR 1.5 95% CI [1.0 – 2.4]].

DISCUSSION

This report provides new knowledge on the dietary habits of children attending public and private schools in Khartoum state, Sudan. No association was found between the total consumption frequency of the 7 food items [sum FFQ score and sum FBC score] and caries experience [DMFT>0] in the whole sample despite the high reported frequency of snack intake. This may be accounted for by the low inter-individual variation of sugar-sweetened snack intake. In the present study, the frequent daily brushing [93.7%] may have also contributed to the protection against dental caries. Similar situations have been reported in recent cross-sectional studies [20]. Burt *et al*. [21] reviewed the clinical evidence about frequency of sugar intake and concluded that the difficulty experienced in identifying the impact the clinical impact of dietary

factors might be due to the interaction between diet and oral hygiene . More recent experimental studies suggested that there is no simple relationship between the sucrose content of food and dental caries [22].

The prevalence of caries was skewed in this population. In addition, the prevalence was low in itself. To further explore associations, a HCEG [DMFT > 1, n=141] was defined to investigate closely the attributes of the higher risk group even though the proportion of subjects in this group with high DMFT was extremely low. When the HCEG was studied against the FFQ and FBC through unadjusted bivariate analysis, the children gave contradicting reports on the intake of popsicles. They reported significantly higher consumption of popsicles on the FFQ, and significantly lower consumption on the FBC. Popsicles are widely available to all children in schools, despite the local campaigns against them by health professionals because of their controversial mode of preparation. The uncertainty in our findings could be explained by the desirability of children to report low consumption to their school teachers on the FBC questionnaire.

Moreover, the findings of the multiple variable logistic regression model on the FBC results showing the children in the HCEG being 1.5 times more likely to report frequent consumption of soft drinks were in agreement with past studies that have reported associations between soft drinks and dental caries [23, 24]. In the US, high carbonated soft drink consumption appeared to be more characteristic of children aged 6-10 years [25]. However, research data have not been conclusive [26]. When drinks containing sugars are consumed the pH of dental plaque drops. This acid is neutralised by saliva flow and salivary components so that normally within 20-30 minutes plaque pH returns to resting levels [27]. However, the danger lies in the frequent use of such drinks over time.

Ismail *et al*. [28] concluded that despite the extensive use of fluoride products in modern society that render the role of diet in dental caries less important, the frequent use of acidogenic and erosive drinks pose an increased risk in caries development . With the frequent consumption of acidic, sugar-rich soft drinks, children are at a higher risk of acid demineralisation and ultimately leading to caries development and erosion.

The significant association found with school children of lower SES is in disagreement with the assumption that a higher sugar intake is generally expected of school children with a higher SES [10]. SharqElnil and Bahri have a geographical similarity in that they are both located east of the state. The significant association found requires that further investigations be conducted specifically in these areas.

On the relationship between body weight and dental caries, a systematic review by Kantovitz *et al*. [29] concluded that only one out of seven studies with strong levels of evidence showed direct association between obesity and dental caries. Findings in this study also showed no relationship between overweight children and caries. Body Mass Index, as a measure of the current general nutritional status, has shown that

there is no influence from nutrition on the post-eruptive tooth stage [7]. This could be one reason in addition to the fact that overweight children represented a minority group in the studied population in Sudan [8.7%].

The questionnaires in this study were culturally acceptable. They included the sugar-sweetened snacks and beverages most frequently reported during the pilot in-depth interviews and these were available in the school canteens and neighbouring shops. Results from the qualitative interviews were used to construct the quantitative FFQ and FBC questionnaires in a modest sequential mixed methods attempt.

In the test-retest reliability study of the FFQ, the 10-day-interval between the tests was adopted taking into account that eating habits particularly tended to change rapidly and these changes could be mistaken for poor performance on the questionnaire over time [30]. Food Frequency Questionnaire showed acceptable reliability among 12-year-olds in this study and previous ones and is a significant tool in reporting generalized patterns of food intake [18].

It has been the tradition to report a test for internal consistency for FFQ using Cronbach's alpha [31, 32]. The score of 0.5 in this study is within the low reliability margin [<0.7][33]. In this case the items are independent of each other, suggesting that no similar scores should be expected. Thus, a score of 0.5 is acceptable in the type of questionnaires used in the present study.

The two administered questionnaires may seem to be measuring the same dietary habits, but it is evident from the design that they were examining behaviour in different time periods. The FFQ in this study was administered on the same day as the clinical examination creating a relatively different platform for association as opposed to FBC which was measured in some schools 8 weeks after the clinical examination.

A limitation of FFQ and FBC is in the recall and information bias such as under-reporting and over-reporting. Children may also tend to proclaim more frequent intake and this postulated to be due to a social desirability to belong to the affluent group who consume higher levels of sweetened products [34]. Furthermore, the response of the school children to the FBC and FFQ may have been affected by bias related to the interviewer. In the case of FFQ, the field assistants, although calibrated, were anonymous to the school children, while FBC was conducted by a class teacher, who was well-known to the children, suggesting that they may have had the tendency to give desirable answers.

The limitation of cross-sectional studies is acknowledged in inferring results from simultaneous measurement of risk indicators and disease. Since caries is a progressive disease, it is possible that the dietary habits several years ago may have resulted in the present disease levels and such an element cannot be captured in a cross-sectional study design. Thus, when feasible, association between diet and dental caries is better investigated using longitudinal study designs examining the change in habits with development of caries [21]. In future studies, FBC may be administered on more than

three days. Studies have proposed that at least 7 days are needed to rank subjects to an acceptable degree of accuracy [35]. However, the strength of this study is in the relatively large and representative sample size thathas been achieved.

Nevertheless, it is suggested that popsicles need to be assessed and their sugar content controlled. Frequent consumption of soft drinks should be discouraged. Negative admonition to stop using these drinks is not likely to be successful. Guidance for dental health, therefore, should follow current guidelines to limit intake of soft drinks to meal times, and to brush teeth following that. School health promotion programs should be established, with the common risk factor approach in mind, thus, addressing the risk factor of poor dietary habits which is common to many chronic conditions within a wider context [36].

CONCLUSION

The hypothesis that the frequency of intake of sugar-sweetened snacks or beverages is associated with caries experience and socio-demographics in Khartoum's 12-year-old school children is true for the higher caries experience group, suggesting that the high consumption of soft drinks could be a risk indicator for dental caries.

Acknowledgments
We gratefully acknowledge the participants, and the teachers who assisted with the interviews.

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Table 1: Test-retest reliability results [FFQ]**:** Mean consumption of sugar-sweetened snacks and beverage items at time 1 [Day 0] and time 2 [Day 10]

ITEM	TIME 1 MEAN [SD]#	TIME 2 MEAN [SD]#	P-VALUE [WILCOXON] ¤	KAPPA [P-VALUE]	% AGREEMENT *
	[n=20]	[n=20]			
Sweet biscuits	0.85 [0.4]	0.83 [0.4]	0.60	0.36 [0.02]	83
Chocolates	0.63 [0.5]	0.63 [0.5]	0.71	0.89 [0.00]	95
Popsicles	0.78 [0.4]	0.73 [0.4]	0.62	0.61 [0.00]	85
Fizzy drinks	0.70 [0.5]	0.70 0.5]	0.81	0.41 [0.01]	76
Sugar-sweetened hot beverages	0.95 [0.2]	0.98 [0.2]	0.56	-0.03 [0.82]	93
Dessert	0.68 [0.5]	0.60 [0.5]	0.27	0.63 [0.00]	83
Sweets	0.73 [0.4]	0.76 [0.4]	0.18	0.68 [0.00]	86

Mean of the FFQ dichotomous variable: '0'- not daily consumption '1'- daily consumption.

¤ Test showing no significant difference between the intake assessed at time 1 and time 2

* Describes the percentage of responses that were in complete agreement between time 1 and time 2.

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Table 2: Percent frequency prevalence of socio-demographic, BMI, snack intakes and attitudes by caries experience [DMFT≤1 vs. DMFT>1]

	[DMFT≤1] n = 968	HCEG [DMFT>1] n = 141#	Adjusted multivariate Regression OR[95% CI] ¤ FFQ	FBC
Socio demographics				
Gender [boys]	50.4	46.8	0.8[0.6-1.2]	0.8[0.6-1.1]
School sector [private]	48.6	58.2*	1.3[0.9-2.0]	1.1[0.7-1.6]
Parent's education [both high]	55.6	59.2		
Socioeconomic status [higher SES]	39.8	50.7*	1.4[1.0-2.1]	1.4[0.9-2.0]
BMI				
Underweight	28.1	26.4		
Overweight and those at risk of becoming Overweight	14.1	13.6		
Sugar-sweetened snack intake on a daily basis – FFQ				
Sweet biscuits	65.8	66.7		
Popsicles	68.4	76.6*	1.2[0.6-2.4]	
Chocolates	78.4	75.2		
Soft drinks	68.5	58.9		
Dessert	69.3	63.8		
Sweets	51.0	47.5		
Sugar-sweetened snack intake three times a week – FBC				
Sweet biscuits	21.9	19.9		
Popsicles	19.9	12.8*		0.6[0.4-1.3]
Chocolates	12.3	17.0		
Soft drinks	21.1	30.5*		1.5[1.0-2.3]*
Dessert	12.2	10.6		
Sweets	15.7	12.8		
Attitude towards intake of sugar-sweetened snack items				
Buy sweets from school	65.7	60.3		
Buy sweets from shops	85.8	84.4		
Find sweets at home	49.0	53.2		
Were advised on sweet intake by parents	64.5	70.2		
School children think sweets are bad for their teeth	82.6	87.9		
Tooth brushing regular	93.5	94.3		

Chi-square

* p value ≤ 0.05¤

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