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Knowledge, attitudes and practices of sweet food and beverage consumption and its association with dental caries among schoolchildren in Jazan, Saudi Arabia

F.A.Quadri,1H.Hendriyani,2A.Pramono3andM.Jafer1
المعارف والاتجاهات والممارسات المتعلقة باستهلاك الأطعمة والمشروبات الحلوة وارتباط ذلك بتسوس الأسنان بين أطفال المدارس في جازان، المملكة العربية السعودية فائق علي قادري، هيني هينديرياني، أدريان برامونو، م. جعفر الخلاصة: من المتوقع أن يرتفع انتشار نخر الأسنان في العديد من البلدان النامية بسبب تزايد استهلاك السكريات. ولقد هدفت هذه الدراسة إلى تقييم المعارف والاتجاهات والممارسات المتعلقة باستهلاك الأطعمة والمشروبات الحلوة لدى أطفال المدارس في جازان بالمملكة العربية السعودية، وإلى تحديد علاقة ذلك بتسوس الأسنان. ففي دراسة وصفيّة مقطعية تم تقييم 853 طفلاً تراوح أعمارهم بين 6-15 سنة (520 من الفتيات و 333 فتاة)، وذلك باستخدام استبيان وفحوص سريرية. فكان انتشار التسوس مرتفعاً (91.3%). وعى الرغم من أن المعرفة كانت جيدة (... الأسنان المنخورة والمقلوعة والمحشوة عموماً فإن 83.5% من الفتيان و 85.8% من الفتيات كانت اتجاهاتهم نحو الأطعمة الحلوة سيئة، وكان < 90% منهم يستهلكون الأطعمة/المشروبات الحلوة بكثرة. وأظهر تحليل التحوُّف المتعدد أن الأطفال الذين والأطفال الذين لديهم اتجاهات وممارسات (OR 2.46; CI: 1.15-5.28) كانت أمهاتهم أقلّ تعليماً كانوا (على التوالي) (OR 4.05; CI: 2.33-7.03 OR 7.80; CI: 4.50-13.52) تغذوية سيئة ABSTRACT.

The prevalence of dental decay is expected to rise in many developing countries due to the growing consumption of sugars. This study aimed to assess knowledge, attitudes and practices of sweet food and beverage consumption among schoolchildren in Jazan, Saudi Arabia and to determine the relationship with dental caries. In a cross-sectional, descriptive study 853 children aged 6–15 years (520 boys and 333 girls) were assessed by questionnaire and clinical examinations. Caries prevalence (≥ 1 dft/DMFT) was high (91.3%). While knowledge was generally good, 83.5% boys and 85.8% girls had poor attitudes to sweet foods and > 90% frequently consumed sweet foods/beverages. Multiple regression analysis showed that children whose mothers were less educated (OR 2.46; 95% CI: 1.15–5.28) and children with poor dietary attitudes and practices (OR 4.05; 95% CI: 2.33–7.03 and OR 7.80; 95% CI: 4.50–13.52 respectively) were more likely to have dental caries. Well-directed health promotion programmes are needed in Jazan.

Connaissances, attitudes et pratiques en matière de consommation d'aliments et de boissons sucrés et leur association avec les caries dentaires chez des écoliers de Jazan (Arabie saoudite) RÉSUMÉ Dans de nombreux pays en développement, la prévalence des caries dentaires devrait augmenter en raison de la consommation croissante de sucres. La présente étude visait à évaluer les connaissances, attitudes et pratiques en matière de consommation d'aliments et de boissons sucrés chez des

écoliers de Jazan (Arabie saoudite), et à déterminer leur lien avec les caries dentaires. Dans une étude descriptive et transversale, 853 enfants âgés de 6 à 15 ans (520 garçons et 333 filles) ont été évalués à l'aide d'un questionnaire et d'exams cliniques. La prévalence de caries ($1 \geq$ indice des dents cariées, absentes ou obturées) était forte (91,3 %). Si le niveau de connaissances était élevé en général, 83,5 % des garçons et 85,8 % des filles avaient de mauvaises attitudes face aux aliments sucrés et plus de 90 % en consommaient fréquemment. Une analyse de régression multiple a démontré que les enfants dont les mères avaient un niveau d'études plus faible (OR 2,46 ; IC à 95 % : 1,15–5,28) mais aussi ceux ayant de mauvaises attitudes et pratiques (OR 4,05 ; IC à 95 % : 2,33–7,03 et OR 7,80 ; IC à 95 % : 4,50–13,52 respectivement) étaient plus à risque de présenter des caries dentaires. Des programmes de promotion de la santé convenablement ciblés sont nécessaires à Jazan.

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Introduction According to the World Health Organization (WHO) dental caries is one of the most common oral diseases; epidemiological studies over the past 20 years have shown an alarmingly high prevalence in children and young adults (1,2). Despite this awareness, a high prevalence of dental caries still exists in many countries worldwide, especially among deprived groups of the population (3). The prevalence of dental decay is expected to rise in many developing countries and this has been attributed to modernization and the growing consumption of dietary sugars (3). The association of sugar consumption and dental caries is well-established by a variety of research, including human studies, animal experiments and other observational studies (4), and a reduction in caries scores has been observed with lower consumption of sugars (4,5). Knowledge about the intake of sugar in early life is important for caries prevention in adulthood due to children's inclination towards sweet foods and beverages (6). Recognizing early childhood food patterns and preferences is important, as it can influence the choice of nutrient intake in later life (7). For example, a higher intake of sugared soda drinks during school ages persists in adulthood when compared with those who started their consumption after the school years (8,9). Gender differences in terms of sweet food preferences were also reported in a large study of 8900 Danish schoolchildren and young adults (10). The distribution and severity of caries and related problems show discrepancies between countries and also across different regions within the same nation (3). In Saudi Arabia, despite the extensive network and free availability of dental health services, caries is a major oral health problem among schoolchildren (11,12). A study in Riyadh showed that the prevalence of caries among schoolchildren was 77.7% (13); 14 years later another study demonstrated a prevalence of 94.4% among a similar age group (12). Amin and Al Abad suggested that frequent exposure to cariogenic foods among schoolchildren in Saudi Arabia is one of the main risk factors for dental decay (14). Hence, knowing the early dietary behaviour among schoolchildren would help in developing oral health promotion programmes in order to prevent a future rise in the incidence of dental caries in Saudi Arabia (15,16). Jazan region in Saudi Arabia is reported to have a high prevalence of caries among school-age children (17). The

current study, the first of its kind in Jazan, aimed to assess the knowledge, attitudes and practices of sweet food consumption among schoolchildren and to determine its relationship to dental caries. Methods Study setting The study was conducted in Jazan, which is located at the southern tip of Saudi Arabia bordering Yemen. The population is mostly Arab nationals with some expatriates. To maintain homogeneity among the study population only Saudi nationals were included in the study. The dental examinations and the administration of the questionnaire was done in the school premises. Study design and sample size This was a cross-sectional, descriptive study using multistage random sampling. School-going children within the age range 6–15 years who agreed to participate were included in the study. The sample size was calculated with absolute precision (0.05), expected proportion (0.5) and estimated designed effect (1). The original sample size after calculation was targeted at 769 and 10% was added to allow for dropouts among the subjects participating in the study. At first, out of the 4 districts of Jazan region, 3 were randomly selected. In the second stage, a list of schools was obtained and 2 schools (1 boys' school and 1 girls' school) from each district were randomly selected: a total of 6 schools. In the third stage, an admission list of schoolchildren was obtained and those whose parents gave consent were recruited for the study. The total sample assessed was 853, consisting of 520 boys and 333 girls. The study was approved by the research ethics committee at Jazan University, Saudi Arabia. Official permission to approach the schools was obtained from the regional education office in Jazan. A signed consent was also taken from the parents for the participation of their children in the research study. Data collection Questionnaire The questionnaire was adapted from the original version prepared by Gibson (18). The English version of the modified questionnaire was subjected to translation and reverse translation in the local language by bilingual dentists who were fluent in both English and Arabic. A convenience sample size of 20 children was randomly selected and the questionnaire was subjected to validity and reliability tests. To check the reliability of the questionnaire a test-retest procedure and a measure of internal consistency using Cronbach alpha coefficient was calculated (19). The questionnaire was found to be consistent as the minimum value of 0.70 was obtained. The interview was conducted by trained and calibrated dentists ($\kappa = 0.78$; 95% confidence interval (CI): 0.53–0.93). Questionnaires for children aged 6–8 years were completed on a one-to-one interview basis with the parents. Older children completed the questionnaire themselves and parents or peers of the children were asked to help if the children had difficulty in understanding the questions. Data regarding sociodemographic variables included 404 current residence, age in years, parental education, parental occupation and family income. Children's knowledge was assessed by answering 15 questions regarding knowledge about sweet foods that are related to poor oral health. Responses were coded as true or false. Dietary attitude was assessed with 10 questions about attitudes to sweet foods and beverages, with responses scored on a 4-point Likert scale [strongly agree (score 3), agree (score 2), disagree (score 1) or strongly disagree (score 0)]. Therefore, the maximum score was 30 and the minimum score was 0. All items of the questionnaire were phrased in a positive direction. Practice of sweet food consumption was assessed by questions about the frequency with which certain food items or food groups were consumed. Children were asked about the frequency of consumption of a list of 8 foods/beverages, with 7 response options. They were subsequent-

merged into 2 groups: "frequently" (score 1) (response options: more than once a day, once a day, 3–6 times a week or 1–2 times a week) and "rarely" (score 0) (response options: every 2 weeks, once a month or never). Therefore, the maximum score was 8 and the minimum score was 0. Caries examination Specific days for the clinical examinations were selected and the schoolchildren were examined by trained and calibrated dentists. The examination was under light-emitting diode light, with standard infection control measures implemented such as the use of gloves, masks and disposable diagnostic instruments. Caries status was scored using the WHO recommended method for assessing decayed/missing/filled teeth for deciduous (dft) and permanent (DMFT) teeth. Children obtaining a dft/DMFT score of 0 were classified as caries-free and those who had ≥ 1 carious teeth were classified as caries active (20). Data management and processing All data information was analysed using SPSS, version 21. The chi-squared test at 5% significance was used for assessing the association between independent variables (education of mother and father, occupational status of mother and father, family income, knowledge status, attitude status and practice status) and the dependent variable (caries status). Logistic regression was performed to determine the risk factor for dental caries after adjusting for covariates. For multivariate analysis, the attitude scores were grouped into "good attitude" (agree and agree very much) and "poor attitude" (disagree and disagree very much) and the consumption practices scores were grouped into "frequently" (1–2 times/week, 3–6 times/week, once a day, more than once a day) and "rarely" (every 2 weeks and once a month). Odds ratios (OR) with 95% CI were also recorded for all variables investigated in the regression logistic analysis. Results Sample characteristics The sample contained 520 boys (61.0%) and 333 girls (39.0%). The sample distribution according to age and sociodemographic variables by sex is shown in Table 1. It can be seen that 54.9% of the schoolchildren in the study were aged between 6–9 years, 13.4% were between 10–12 years and 31.8% were between 13–15 years. The education level of parents revealed that 89.2% of mothers and 74.6% of fathers were educated from elementary until high school. Most of the fathers were self-employed (65.9%) and 87.7% were categorized as having a high family income, although data on family expenses were not collected. Comparing the distribution of income between the sexes, it was observed that 5.4% of girls and 16.7% of boys were from low-income families (Table 1), which was a significant difference (χ^2 test; $P < 0.001$). Dietary knowledge Twelve out of 15 questions on knowledge about sweet foods and beverages were answered correctly by more than 60% of the study sample (Table 2). Three questions were answered incorrectly by a majority of respondents: 71.7% of boys and 72.9% of girls had poor knowledge in distinguishing between various forms of sweet foods (question no. 3); 65.9% of boys and 66.9% of girls did not know which drinks contained more sweeteners (question no. 4); and 56.1% of boys and 70.8% of girls thought soft drinks were healthier than fruit juice (question no. 6). Dietary attitudes and practices The percentage of boys and girls who preferred soft drinks to mineral water were 83.5% and 85.8% respectively. These results were consistent with their answers about choosing soft drinks rather than mineral water in the dietary knowledge analysis. As many as 94.2% of boys and 93.4% of girls preferred sweets to plain bread, and 86.6% of boys and 96.1% of girls did not prefer eating snacks with less sugar (Table 3). The self-reported data about daily intake of sweet foods and beverages revealed that both sexes frequently consumed fruit juice (with sugar), soft drinks, sweets/candy, jam, honey, milk with sugar, chocolate and ice

cream (Table 4). Among both boys and girls, > 90% of the children reported that they frequently consumed soft drinks, sweets, milk with sugar and chocolate. The mean and standard deviation (SD) scores of dietary attitude for boys and girls was 20.2 (SD 1.9) and 19.5 (SD 1.5) respectively (Figure 1). The mean scores of dietary practice for boys and girls were 8.2 (SD 0.9) and 7.3 (SD 0.8) respectively. A significant difference was observed between males and females in attitude scores ($t = 4.834$; $P = 0.001$) as well as in practice scores

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Table 1 Distribution of the studied schoolchildren according to age and sociodemographic variables, by sex

Sociodemographic variables	Boys (n = 520)	Girls (n = 333)	Total (n = 853)
Age (years)			
6–9	280 53.8	188 56.5	468 54.9
10–12	54 10.4	60 18.0	114 13.4
13–15	186 35.8	85 25.5	271 31.8
Mother's education			
Basic education (elementary or high school)	476 91.5	285 85.6	761 89.2
High education (college)	44 8.5	48 14.4	92 10.8
Father's education			
Basic education (elementary or high school)	378 72.7	258 77.5	636 74.6
High education (college)	142 27.3	75 22.5	217 25.4
Mother's occupation			
Employee (government or private)	87 16.7	66 19.8	153 17.9
Unemployed (housewife)	433 83.3	267 80.2	700 82.1
Father's occupation			
Government employee	170 32.7	121 36.3	291 34.1
Private employee	350 67.3	212 63.7	562 65.9
Family income			
Low	87 16.7	18 5.4	105 12.3
High	433 83.3	315 94.6	748 87.7

Table 2 Knowledge about sweet foods and beverages among the studied schoolchildren, by sex

Item	Girls (n = 333)	Boys (n = 520)
Dietary knowledge of sweet foods and beverages		
False	No. %	No. %
True	No. %	No. %
Taste of food related to oral health	106 31.8	227 68.2
182 35.0	338 64.6	
Source of sweet taste of food	63 18.9	270 81.1
132 25.4	658 125.6	
Forms of sweet food	243 73.0	90 27.0
373 71.7	147 28.3	
Sweetened drinks	223 67.0	110 33.0
343 66.0	177 34.0	
Which contains more sugar:		
Mineral water vs fruit juice	22 6.6	311 93.4
37 7.1	483 92.9	
Orange vs soft drinks	236 70.9	97 29.1
292 56.2	228 69.8	
Apple vs sweets	47 14.1	286 85.9
65 12.5	455 87.5	
Grapes vs jam	64 19.2	269 80.8
90 17.3	430 82.7	
Oats vs honey	27 8.1	306 91.9
58 11.2	462 88.8	
Plain bread vs milk with sugar	130 39.0	203 61.0
133 25.6	387 74.4	
Rice vs tea with sugar	22 6.6	311 93.4
42 8.1	478 91.9	
Potatoes vs chocolate	19 5.7	314 94.3
18 3.5	502 96.5	
Carrot vs ice cream	2 0.6	331 99.4
6 1.1	514 98.9	
Fried chicken vs lollypop	8 2.4	325 97.6
14 2.7	506 97.3	
Kebab vs dates	88 26.4	245 73.6
145 27.9	375 65.0	

74.6 28.3 34.0 92.9 43.8 87.5 82.7 88.8 74.4 91.9 96.5 98.9 97.3 72.1 ($t = 2.998$; $P = 0.003$). Boys had significantly higher scores of both attitude and practice in consuming sweet foods and beverages compared with girls, indicating poorer attitudes and greater consumption (Figure 1). Dental caries status Of the examined schoolchildren 779 (91.3%) were found to be caries

406 Table 3 Attitudes towards sweet foods and beverages among the studied schoolchildren, by sex

Item	Girls (n = 333)	Boys (n = 520)
Attitude toward sweet foods and beverages		
Agree very much	No. %	No. %
Agree	No. %	No. %
Disagree	No. %	No. %
Disagree very much	No. %	No. %
Prefer mineral water more than soft drinks	No. %	No. %
Prefer eating plain bread more than sweets	No. %	No. %
Rarely add sugar to my food or drinks	No. %	No. %
Chewing gum should not be used every day	No. %	No. %
Rarely eat sweets as snack	No. %	No. %
Prefer milk with less sugar	No. %	No. %
Prefer tea with less sugar	No. %	No. %
Rarely eat ice cream as snack	No. %	No. %
Prefer eating snacks with less sugar	No. %	No. %
Clean mouth after eating sweet foods	No. %	No. %

0 0.0 2 0.6 7 2.2 4 0 1.2 0.0 0 0.0 0.0 12 3.6 0 0.0 2 0.6 No. % 34 10.3 1 0.3 21 6.4 168 26 1 3 32 13 20 No. % 286 85.8 311 93.4 263 78.8 No. % 13 3.9 19 5.7 42 12.6 No. % 9 1.7 0 0.0 13 2.3 No. % 36 6.9 8 1.5 27 5.2 No. % 434 83.5 490 94.2 432 83.2 No. 41 22 48 % 7 .9 4.3 9.3 50.5 7 .8 0.3 0.9 161 284 228 136 48.3 85.3 68.5

40.8 0 23 104 194 0.0 6.9 31.2 58.3 7 0 3 28 1.4 267 51.3 228 43.8 18
3.5 0.0 22 4.2 449 86.4 49 9.4 0.6 13 2.5 356 68.5 148 28.4 5.4 39 7 .5
238 45.8 215 41.3 9.6 268 3.9 320 6.0 255 80.5 21 96.1 0 76.6 56 2.5 14
0.0 35 16.8 17 1.6 9 1.1 6.7 35 6.7 3.3 34 6.5 482 56.5 450 86.6 438
84.3 15 1.8 0 0.0 31 5.9 407 attitudes and practices were significantly was
examined. The children with poor schoolchildren in Jazan, Saudi Arabia of
sweet food consumption among the knowledge, attitudes and practices The
association of dental caries with Discussion 4.50–13.52). and beverages
(OR 7.80; 95% CI: the practice of consuming sweet foods The best
predictor for caries status was attitude (OR 4.05; 95% CI: 2.33–7.03).
spectively than the children with good more likely to have dental caries re-
with poor attitudes were significantly 2.46; 95% CI: 1.15–5.28). Children
mothers were better educated (OR tal caries compared with children whose
educated were more likely to have den- 7). Children whose mothers were
less kept as independent variables (Table educational status of the mother
were and practice of sweet intake and the as the dependent variable while
attitude ducted whereby caries status was kept Logistic regression analysis
was con- Logistic regression analysis tus (Table 5). education or father’s
occupational sta- mother’s occupational status, father’s but there were no
associations with sex, ies status of their children (P = 0.049), was
significantly associated with the car- The educational status of the mother
versus 72.5%) (P < 0.001). to have poor dietary practices (96.4% with
caries were significantly more likely 0.001) (Table 6). Similarly, children
caries free (94.8% versus 73.8%) (P < when compared with those who
were caries active had poor dietary attitudes More of the children who were
cant (P = 0.471). difference was not statistically signifi- caries than were
female children, but the children were more affected with dental (92.2%)
of the girls (Table 5). Male active: 472 (90.8%) of the boys and 307 طسوتلما
قشئرل ءبحصلا ءلجلما EMHJ • Vol. 21 No. 6 • 2015 Eastern Mediterranean Health
Journal La Revue de Santé de la Méditerranée orientale Table 4 Reported
frequency of consumption sweet foods and beverages among the studied
schoolchildren, by sex Food item Consumption of sweet foods and
beverages Girls (n = 333) Frequently No. % No. Rarely % Frequently No.
% Boys (n = 520) No. Rarely % Fruit juice 281 84.4 52 15.6 403 77.5 117
22.5 Soft drinks 326 97.9 7 2.1 506 97.3 14 2.7 Sweets 325 97.6 8 2.4
504 96.9 16 3.1 Jelly 275 82.6 58 27.4 390 75.0 130 25.0 Honey 261 78.4
72 21.6 402 77.3 118 22.7 Milk with sugar 308 92.5 25 7.5 481 92.5 39
7.5 Chocolate 322 96.7 11 3.3 498 95.8 22 4.2 Ice cream 267 80.2 66
19.8 377 72.5 143 27.5 more likely to be caries active, thus confirming
this as one of the reasons for caries occurrence among the study sample.
These percentages are higher than those reported from another Arab
population study in Baghdad, Iraq (21). The high score in attitudes and
practices of sweet foods and beverages consump- tion seen among
schoolchildren in the Jazan region could be due to easy access to these
items. Most of the Arab nations have experienced a massive growth in their
economy in recent decades and this has been shown to have a strong
association with elevated consumption of refined sugars among the
populations (22). This high per capita sugar con- sumption among the rich
nations has led to a rise in caries occurrence (23). In accordance with the
findings of the current study, previous studies in other countries have also
shown a strong as- sociation between consumption of sugared
foods/beverages and increased rates of caries (24–27). The attitude of
schoolchildren in Jazan towards sweet food consumption was in accordance
with the study of Ahmed et al. in Iraq, in which 12-year-old schoolchildren
preferred sugared snacks or drinks to their regular meals (21). The
reported frequency of consum- ing sweet foods and beverages, which

included soft drinks, sweets, jam, honey, milk with sugar, chocolate and ice cream, was also observed to be high in our study (> 90% of children consumed these frequently, i.e. once a day, once a day or 3–6 times a week). Therefore, it could be said that the schoolchildren in Saudi Arabia are quite familiar with non-traditional forms of food and beverages. A previous study in Saudi Arabia reported that the adoption of a so-called “Westernized” diet with a high sugar content, without the implementation of proper prevention strategies, could lead to a rise in dental caries among the population (11). Our study also found that a high proportion of schoolchildren were caries active (91.3%). This agrees with figures from Peterson et al., who in their review of the global burden of oral diseases reported that dental caries was the main oral health problem affecting almost 90% of schoolchildren throughout the world (2). Our finding is also 20 (1.9) 19 (1.5) 8 (0.9) 7 (0.8) Attitude Practice Attitude Practice Male Female Figure 1 Mean and standard deviation scores on attitudes and practices towards consumption of sweet foods and beverages, by sex (independent t-test for differences between boys and girls, $P < 0.05$) (boys $n = 520$, girls $n = 333$) 408

المجلد الحادي والعشرون العدد السادس المجلد الصحية لشرق المتوسط

Table 5 Association of sociodemographic factors and caries status among the studied schoolchildren

Variable	Caries activea	No. %	Caries free	No. %	P-valueb
Total	779	91.3	74	8.7	
Sex					
Boys	472	90.8	48	9.2	0.471
Girls	307	92.2	26	7.8	
Mother's education					
Basic education (elementary or high school)	700	92.0	61	8.0	0.049
High education (college)	79	85.9	13	14.1	
Mother's occupation					
Employee (government or private)	139	90.8	14	9.2	0.818
Unemployed (housewife)	640	91.4	60	8.6	
Father's education					
Basic education (elementary or high school)	585	92.0	51	8.0	0.244
High education (college)	194	89.4	23	10.6	
Father's occupation					
Government employee	266	91.4	25	8.6	0.950
Private employee	513	91.3	49	8.7	

aBased on decayed/missing/filled teeth for deciduous (dft) and permanent (DMFT) teeth. Caries active = ≥ 1 dft/DMFT; caries free = 0 dft/DMFT. bChi-squared test for association of sociodemographic variables and caries status.

Table 6 Association of knowledge, attitudes and practices of sweet foods and beverages consumption with caries status among the studied schoolchildren

Independent variable	Caries activea	Caries free	P-valueb	No. %	No. %
Dietary knowledge					
Poor	220	89.8		25	49
Good	559	91.9	10.2	0.314	8.1
Dietary attitudes					
Poor	675	104	94.8	37	73.8
Good	220	89.8	559	91.9	25
Dietary practices					
Poor	24	72.5	50	3.6	< 0.001
Good	647	132	96.4	24	72.5

aBased on decayed/missing/filled teeth for deciduous (dft) and permanent (DMFT) teeth. Caries active = ≥ 1 dft/DMFT; caries free = 0 dft/DMFT. bChi-squared test for association of sociodemographic variables and caries status.

Table 7 Multivariate logistic regression analysis of predictors of caries status among the studied schoolchildren

Predictorsa	Association with caries statusb	B	SE	df	P-value	Adjusted OR	95% CI
Mother's education		0.900	0.390	1	0.021	2.46	
Attitude to consumption of sweet foods and beverages		1.398	0.282	2.054	0.281	1	< 0.001
Practice of consumption of sweet foods and beverages		4.05	7.80	1.15–5.28	2.33–7.03	4.50–13.52	

aCaries predictors were coded as 1 = good, 0 = poor; bCaries status was coded as 1 = caries free, 0 = caries active. SE = standard error of beta; OR = odds ratio; CI = confidence interval; min. = minimum; max. = maximum.

409 EMHJ • Vol. 21 No. 6 • 2015 Eastern Mediterranean Health Journal La Revue de Santé de la Méditerranée orientale consistent with a study conducted by Zailai et al. in a similar population (in Jazan), whereby 89% of children were seen to be caries active (28). An earlier study conducted in Saudi Arabia by Amin and Al Abad found that 68.9% of male primary-school children were suffering from dental caries (14). The high caries prevalence found among the children in the current study could

be attributed to many factors such as poor oral hygiene practice, excessive sweet consumption or inadequate visits to the dentist. The significant association of caries status with the educational level of mothers and lack of association with the working status of mothers, education of fathers, working status of fathers and sex ($P > 0.05$) were in accordance with another study in the Middle East, in Iraq (21). Hence, better educated mothers have a positive influence on a child's oral health status. In addition, a strong association between caries status and both attitudes and practices of sugared food intake was found, suggesting consumption of higher than normal amounts of sugar among these children had increased the prevalence of dental caries (5,29). This is a matter of great concern as increased sugar consumption could not only lead to dental caries but could also be a factor in other systemic diseases such as childhood obesity and diabetes. In contrast to the practices followed by these schoolchildren, the questions pertaining to knowledge were answered correctly, indicating that although the children possessed good knowledge their attitudes and practices towards risk factors leading to dental caries were poor. This calls for effective health promotion programmes in the region. It is important that the harmful effects of sugared foods and beverages are understood by the children so that good habits can be implemented in their dietary practices at a younger age. The results of the current study add to the evidence that good dietary behaviour is a key aspect in preventing dental caries. They also stress that among the factors assessed—dietary knowledge, attitudes and practices—the best predictor for caries occurrence was the practice of sweet food consumption. Apart from the positive aspects of the study design, the study has some limitations. The evaluation of dental caries among the schoolchildren could have been done in a more comprehensive way. For example, we could have divided the carious lesions into cavitated and non-cavitated and then checked the association with sugared food consumption. In conclusion, our results provide further evidence that poor dietary attitude and practices of sweet food consumption are associated with active caries status among schoolchildren. We recommend that the impact of consumption of sweet foods and beverages in the country should be further investigated. The study suggests that there is a need for well-directed health promotion and health education programmes among the schools in Jazan, Saudi Arabia. Acknowledgements Funding: The authors would like to acknowledge the research committee at the College of Dentistry, Jazan

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