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Consumption of sugar products and associated life- and school-satisfaction and self-esteem factors among schoolchildren in Kuwait

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Abstract

Objective. The objective of this study was to assess how frequently schoolchildren report consuming sweets, soft drinks, and cakes, and whether life- and school-satisfaction and self-esteem factors are associated with the consumption of these sugar products. ***Material and Methods***. A total of 2,312 schoolchildren between the ages of 11 and 13 years from the government schools in Kuwait completed an anonymous structured questionnaire during 2002 and 2003. A representative sample of children from all six governorates of the country was drawn into the study. The questionnaire of the Health Behaviour in School-Aged Children (HBSC) survey was translated from English to Arabic and was used after modification to suit Kuwaitis. The chi-square test and logistic regression model were used in the analysis. ***Results***. A large proportion of children reported consuming sweets (42%), soft drinks (43%), and cakes (31%) several times a day. Almost every fourth child reported consuming all these sugar products more than once a day. All life-satisfaction and self-esteem variables and almost all school-satisfaction variables seemed to associate with more-than-once-a-day consumption of sugar products. When all the associated variables were analyzed together using the logistic regression model, the life- and school-satisfaction and self-esteem factors seemed to have a stronger association with frequent sugar consumption than did gender, grade, or nationality. ***Conclusions***. Consumption of sugar products was common among schoolchildren in Kuwait, and both positive and negative life-satisfaction and self-esteem factors were associated.

Key Words: *Adolescence, sugar consumption, life-satisfaction, school-satisfaction, self-esteem*

Introduction

Adolescence is a time of rapid growth, and adequate nutrition is of key importance in meeting the requirements for normal growth and development [1]. Adolescence is also a critical period for the initiation or development of healthy or risk behavior that may be maintained into adulthood [2–4]. For example, adolescents' eating behaviors appear largely to have been established by mid-adolescence [5]. Many dietary habits established in youth are continued into adulthood, and diet during childhood and adolescence influences the risk of chronic diseases such as cardiovascular diseases, diabetes, and dental caries [6–8]. In Kuwait, dental caries has been increasing among children during the past 20 years [9], in contrast to the trend in most other industrialized countries [10]. The increasing trend in obesity worldwide among adults and children is also occurring in Kuwait, where the prevalence of adult obesity and related non-insulin dependent diabetes mellitus is among the highest in the Arabian Peninsula [11–13].

The role of dietary sugars in the etiology of dental caries is well established [14]. Low caries rates are associated with a low availability of sugar in nations throughout the world [15]. The quantity of sugar consumed on a population basis is closely related to incidence of caries [16]. At levels of sugar consumption below 10 kg/person/year the incidence of dental caries is acceptably low [17]. In many industrialized countries the sugar consumption levels are much higher, at between 30 and 50 kg [18]. In Kuwait, sugar consumption increased from 19 kg per capita in 1991 to 34 kg in 1994 and has remained at that level since then [18]. However, although some studies show that the amount of sugar consumed in a population is closely related to the frequency of intake, sugar supply data need not be strongly

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correlated with the frequency of intake of cariogenic food with added sucrose, since plaque biochemistry strongly suggests that frequency of intake is actually the determinant of caries activity and not the quantity consumed [14,19]. The majority of non-milk extrinsic sugars in the diets of children are from between-meal snacks like confectionery, sugar-sweetened soft drinks, table sugar, and biscuits/cakes [20,21].

Prevalence of childhood overweight is high worldwide and has increased dramatically lately [22,23]. The increased risk of childhood obesity is associated especially with the consumption of sugar-sweetened beverages [24–26], which are often consumed between traditional meal-eating episodes [27]. Excessive sweetened drink consumption is also associated with the displacement of milk from children's diets and higher daily energy intake [25]. As children progress from childhood to early adolescence, the prevalence and frequency of consuming milk and fruit juices decreases and soft drinks intake increases [28,29]. In the USA, between 1965 and 1996 the milk consumption of adolescents declined by 36% and was replaced mainly by soft drinks, soda, and fruit drinks [30]. During the past 20 years there has been a more than 2-fold increase among children's and adolescents' beverage consumption [29], while in the UK the consumption among children increased between 1950 and 1992 from 13 g/week to 446 g/week [31].

For children, eating confectionery is typically a social occasion, and other eaters, i.e. parents, other adults, peers, and siblings, influence the development of their own preferences and eating behaviors [32]. It has been assumed that the food environment of parents shapes their children's preferences and food acceptance patterns [32]. Preference of high levels of sweetness is evident in children worldwide [33], and with high intake of added sugars the intake of essential micronutrients decreases [34]. Low-fat diets have led to an increase in the consumption of the simple sugars [35]. Currently, teens consume more added sugars as a percentage of total energy than any other age group [34], and children between 8 and 16 years spend more on cariogenic sweets and snacks than ever before [36].

Many theories have been presented to explain eating behavior. However, understanding what determines an individual's dietary preferences and how to change this behavior is limited. In social cognitive theory, both personal and environmental factors are included [37]. Antonovsky [38] showed health to be connected with an individual's sense of coherence and generalized resistance resources, such as income, education, ego strength, knowledge, which would be influential factors in this salutogenic model (explaining the origin of health). According to the Sense of Coherence (SOC) concept, adolescents with low SOC scores have higher sucrose intake than others [39]. However, to date, only a few analytical studies applying theory to investigate personal as well as environmental factors influencing adolescents' eating behaviors have been published [40–44]. Locus of control theory describes a generalized perception of who or what is control of one's health. Self-efficacy theory is more situation specific, focused on beliefs about one's personal abilities in specific settings, e.g. at school [45]. Self-efficacy is more strongly related to health behavior than locus of control [46]. There is no comprehensive theory of the determinants of health behavior and so these aspects have been developed in the Health Behaviour in School-Aged Children study. The most relevant indicators of these previously presented theories have been adopted in this project [47].

Consumption of sugar products has recently been studied in Kuwait among sixth-grade children and their mothers [48], among 12-year-olds [49], and among university students [50]. However, the samples in these studies were small and non-representative. Our study included several variables describing different personality and self-coherence factors and were considered as means of life- and school-satisfaction and self-esteem. These factors have been shown to associate with food choices in earlier studies [39,46,51]. The objective of this study was to assess how frequently sweets, soft drinks, and cakes are consumed among nationally representative groups of schoolchildren in Kuwait, and whether life and school-satisfaction and self-esteem factors are associated with regular consumption of these sugar products.

Material and methods

Sample

A representative sample of schoolchildren from the fifth and seventh grades (between 11 and 13 years of age) from all six governorates (i.e. health authority regions) within Kuwait were included in the study. Only government intermediate schools were included, since the majority of children in private schools are expatriates. A two-stage sampling process was adopted. Schools were randomly selected from the list provided by the Ministry of Education, Research Department, with individual classes as sampling clusters, and all pupils in each class were invited to participate. Principals selected 2–3 classes from each school as convenient for teaching and examination timetables. The total number of government schools at the intermediate level was 78 for boys and 86 for girls, with 1,536/1,506 classes and 46,704/39,871 pupils [52]. Each class had approximately 30 children, with classes at the girls' schools a bit smaller than at the boys' schools. Altogether 2,556 pupils were invited to take part in the study. The sampling process followed

the recommendations of the Health Behaviour in School-Aged Children (HBSC) study, a WHO Collaborative Study protocol, and sample size estimation was calculated from previous HBSC studies [47]. A total of 24 (11 for boys and 13 for girls) schools participated in the study: 17 schools for the fifth-grade and 19 schools for the seventh-grade. For the fifth-grade, 54% (37/68) of the classes at the schools participated and for the seventh-grade 65% (47/76). Most pupils were present at the time of the questionnaire, but from some classes 1–3 pupils were absent and were not approached afterwards.

Implementation of the study

Permission to conduct the study in Kuwaiti government schools was requested from the Ministry of Education and regionally from the educational directors of the districts. The Research Ethics Committee of the Faculty of Dentistry, Kuwait University, gave ethical permission for the study. When permission was granted, the headmasters of the selected schools were approached by the principal investigator (S.H.) and an Arabic-speaking associate (N.S.). The aims and procedure of the study were explained. Some schools (5) refused to participate because examinations were being held or the headmasters believed that the questionnaire was too difficult for their pupils. Replacements were selected randomly from the same governorate.

The study was interrupted by the war in Iraq at the beginning of 2003, during which time data from questionnaires already returned were entered and checked. Some schools had selected children who were too young for the study and who left too many questions unanswered. Those schools (3) were omitted from the final sample and replacements were selected. However, because of the war and disruptions to the school timetable, new schools were approached the following October, at the same time as the previous year. The final sample was 2,312 students, or 93% of all students in the selected classes. About half of the sample comprised boys and half girls (51/49%). Fifth-grade pupils comprised 44% and seventh graders 56% of the sample. The mean age of the pupils was 11.9 years (SD $\pm$1.3). The majority (84%) of respondents were Kuwaitis, while the rest were from other Arab countries.

Study instrument

The questionnaire for the Health Behaviour in School-Aged Children Study was used in this research after being modified to suit Kuwait and translated and back-translated from English to Arabic by two independent translators. A pilot study had been conducted in two areas during April 2002, resulting in minor modifications concerning accuracy of the language in some questions. The protocol for the HBSC study for 1997/1998 [47] was used with the permission of the international coordinator of the project. HBSC is a cross-national research project conducted in collaboration with the WHO Regional Office for Europe. The overall goals of the survey are to gain new insight into and to increase our understanding of health behaviors and lifestyles among young people in a social context, as well as to understand how young people perceive health and well-being itself [47].

Our study was conducted from October to December 2002, and in October 2003. The children filled out the questionnaire in their classrooms during one regular class session (about 45 min) supervised by teachers who followed instructions given by researchers. The aim was for the children to fill out the questionnaire anonymously and as independently as possible. Teachers could help only if a student had difficulty understanding what a question meant. Informed consent was requested from the parents of the fifth-grade pupils, while headmasters decided that seventh-graders were old enough to give consent themselves. The supervising teacher completed a classroom information sheet for each participating classroom which provided information on class size and absentees. Each pupil placed the completed questionnaire in a blank envelope and sealed it, and a driver from the university collected the forms.

Variables

The questionnaire comprised 84 structured questions, 57 of which were mandatory core or focus questions asked in all HBSC participating countries. The rest of the questionnaire was country-specific, and each country could decide what kind of questions and how many to include. The main areas covered in the questionnaire were health (self-rated health, self-rated fitness, and experience of symptoms), health behaviors (smoking, physical activity, sedentary leisure activity, eating habits, and toothbrushing), social relationships, and demographic characteristics.

A series of 19 questions considered diet and included consumption of sweets (candy or chocolate), soft drinks (coke or other sugar-containing), and cakes (or pastries). The structured question was "How often do you drink or eat the following?" Five options were given: more than once a day; once a day; at least once a week but not daily; less than once a week; never. For binary analysis, the answers were recoded into three categories (more than once a day; once a day; less than once a day), and for the logistic regression model into two categories (more than once a day, once a day or less often). Also a dichotomous summary variable was created by classifying the children who used all three sugar

products more than once a day into one category and leaving the rest to the other.

Socio-demographic factors identified in this study were gender, grade (5th, 7th), nationality (Kuwaiti, non-Kuwaiti Arab), and place of residence (governorates: Al-Ahmadi, Al-Jahra, Capital, Hawally, Farwaniya, Mubarak Al-Kabeer). Socio-economic status (SES) was determined by self-reported family financial status. The following question was used: "How well off do you think your family is?" The alternatives given were: very well off; well off; average; not very well off; not at all well-off; don't know. For the analyses, this was recoded to: very well off; well off; average or below; don't know. Self-reported school performance was also used in the analysis. The question concerning school performance was: "In your opinion, what does your class teacher(s) think about your school performance compared to your classmates? He/she thinks I'm: very good; good; average; below average". In the analyses, answers were recoded into three categories: very good; good; average/below average.

Life-satisfaction was measured by the following questions:

1. Happiness: "In general, how do you feel about your life at present? I feel very happy; I feel happy; I don't feel happy; I'm not happy at all." (In the analysis the following categories were used: very happy; happy; not happy.)
2. Loneliness: "Do you ever feel lonely? Very often; rather often; sometimes; never." (Often; sometimes; never.)
3. Number of close friends: "How many close friends do you have now?" (None; 1; 2; 3 or more.)

School-satisfaction was measured by the following questions:

1. Enjoy being with classmates: "Do the pupils in your class enjoy being together? Always; often; sometimes; rarely; never." (Always; often; sometimes or never.)
2. Enjoy being at school: "Is it great to be in your school. Strongly agree; agree; neither agree nor disagree; disagree; strongly disagree." (Strongly agree; agree; neutral; disagree.)
3. Going to school boring: "How often do you think that going to school is boring? Very often; often; sometimes; rarely; never." (Often; sometimes; rarely or never.)
4. Skip classes: "How often did you skip classes or school this term? Never; sometimes."

Self-esteem was measured by the following questions:

1. Nervousness: "In the last 6 months, how often have you felt nervous? About every day; more than once a week; about every week; about every month; rarely or never." (Daily; weekly; rarely or never.)
2. Self-confidence: "How often do you feel self-confident? Always; often; sometimes; rarely; never." (Always; often; sometimes or never.)
3. Acceptability: "Do other pupils accept you as you are? Always; often; sometimes; rarely; never." (Always; often; sometimes or never.)
4. Body image: "Do you think your body is: Much too thin; a bit too thin; about the right size; a bit too fat; much too fat; I don't think about it?" (Too thin; right size; too fat; I don't think about it.)
5. Appearance: "Do you think you are: Very good looking; quite good looking; about average; not very good looking; not at all good looking; I don't think about it?" (Very good looking; quite good looking; average or not good looking; I don't think about it.)

Statistical analysis

Data entry and analysis were performed using the SPSS statistical package (versions 11 and 12). Variation in the distributions of the consumption of sugar products (sweets, soft drinks, cakes, and all three together) was analyzed using cross-tabulations according to socio-demographic, socio-economic, life- and school-satisfaction and self-esteem factors. Statistical significances of the bivariate analyses were measured with the chi-square test. A logistic regression model was used to estimate the odds ratios (OR) and their confidence intervals (95% CI) for consuming sugar products separately for each sugar product (more often than once a day) and for the summary variable (more-than-once-a-day consumption of all three sugar products). The socio-demographic, SES, life- and school-satisfaction and self-esteem factors used were those that gave statistically significant association with the consumption of these sugar products in the binary analyses. For the final logistic model, only the variables that were significant in the multivariate analysis for the consumption of the different sugar products and for the summary sugar variable were included.

Results

Girls were more often more-than-once-a-day consumers of sweets (46%) than boys (38%), and boys of soft drinks (46/40%) and cakes (44/41%) (Table I). The proportion of children who consumed all three sugar products several times a day was as high as 18%. In addition, there were once-a-day consumers 27/27%, 26/29%, and 26/26%, respectively. The proportions of frequent consumers of all the sugar products studied increased by grade. Kuwaiti children were more often frequent consumers of soft drinks and cakes than non-Kuwaiti

Table I. More-than-once-a-day consumption of sugar products (%) among the intermediate schoolchildren in Kuwait in 2002/2003 according to the socio-demographic and SES variables and school performance

Variables	Sweets	*p*-value	Soft drinks	*p*-value	Cakes	*p*-value	All three products	*p*-value
Gender								
Boy	38		46		44		17	
Girl	46	0.001	40	0.024	41	0.266	20	0.308
Grade								
5th	38		40		42		16	
7th	45	0.001	45	<0.001	44	0.352	21	0.003
Nationality								
Non-Kuwaiti	39		33		50		14	
Kuwaiti	43	0.077	45	0.001	41	0.013	19	0.094
Place of residence								
Al-Ahmadi	43		40		41		18	
Al-Jahra	45		44		37		20	
Capital	41		46		45		18	
Farwaniya	37		40		43		17	
Hawally	45		45		46		21	
Mubarak Al-Kabeer	42	0.631	44	0.638	48	0.161	17	0.936
Family financial status								
Very well-off	44		44		39		22	
Well off	40		42		47		15	
Average/below average	37		35		48		14	
Don't know	43	0.404	45	0.161	43	0.026	19	0.022
School performance								
Very good	40		41		44		18	
Good	45		45		39		18	
Average or below	46	0.064	48	0.143	42	0.444	20	0.071

children. There were no significant differences in the proportions of frequent consumers according to place of residence or school performance of the child. Family financial status had association only with the frequent consumption of cakes and all three sugar products.

All *life-satisfaction variables* seemed to be associated with more-than-once-a-day consumption of sugar products (Table II). Only the number of close friends did not correlate with the frequent consumption of cakes. There were significantly more children consuming sweets, soft drinks, and cakes more than once a day among those children who did not feel happy and/or often felt lonely. However, those children who had three or more close friends were most often frequent consumers of sweets and soft drinks.

Similarly, all *school-satisfaction variables* (Table II) were associated with more-than-once-a-day consumption of these sugar products, with few exceptions. However, enjoying being with classmates always seemed to be associated with the higher proportion of the frequent consumption of all three sugar products. Skipping classes sometimes was also very strongly associated with the frequent consumption of all these sugar products.

Self-esteem variables were all associated with more-than-once-a-day consumption of sugar products. The children who always felt self-confident, always felt accepted by the other pupils, or felt very good looking also consumed sugar products more frequently. However, also the children who felt nervous on a daily basis or felt being too thin seemed to have higher proportions of frequent consumers of these sugar products.

When all the associated variables were analyzed together using the logistic regression model, the life and school-satisfaction and self-esteem factors seemed to be more strongly associated with frequent sugar consumption than gender, grade, or nationality (Table III). Feeling nervous daily, in particular, increased OR for more-than-once-a-day consumption of sweets, soft drinks, and cakes. Also feeling bored about going to school seemed to increase OR for frequent consumption of sweets and soft drinks.

Discussion

The main finding of this study was the alarmingly high consumption of sugar products, which has also been found in the earlier studies, e.g. among first-graders in Kuwait, 83% ate chocolate, 63% biscuits, and 57% cakes/pastries; 76% drank soft drinks every day [48]. Among 12-year-old children, 74% reported consuming soft drinks daily, 55% sweets, and 40% biscuits/cakes [49]. This high level was also in accordance with the findings among children from nearby countries, such as Saudi Arabia and Jordan [53,54]. The figures for daily consumption of sweets and soft drinks were clearly higher in Kuwait than in

Table II. More-than-once-a-day consumption (%) of sugar products among the intermediate schoolchildren in Kuwait according to the life- and school-satisfaction and self-esteem variables in 2002/2003

Variables	Sweets	*p*-value	Soft drinks	*p*-value	Cakes	*p*-value	All three products	*p*-value
LIFE-SATISFACTION								
1. Happiness								
very happy	42		43		34		20	
happy	39		41		23		14	
not happy	51	0.009	48	0.106	36	<0.001	25	<0.001
2. Loneliness								
yes, often	47		49		37		24	
sometimes	43		44		29		17	
never	38	<0.001	38	<0.001	28	<0.001	16	0.002
3. Number of close friends								
none	38		30		28		14	
one	43		43		32		21	
two	36		37		25		15	
3 or more	44	<0.001	46	<0.001	32	0.104	19	0.001
SCHOOL-SATISFACTION								
1. Enjoy being with classmates								
always	45		46		35		23	
often	39		38		26		13	
sometimes/never	39	<0.001	39	0.009	27	<0.001	16	<0.001
2. Enjoy being at school								
strongly agree	42		44		34		22	
agree	37		37		27		16	
neutral	42		45		29		19	
disagree	45	0.054	47	0.008	31	0.094	20	0.039
3. Going to school boring								
often	50		52		37		24	
sometimes	42		44		30		18	
rarely/never	36	<0.001	34	<0.001	27	<0.001	15	<0.001
4. Skip classes								
no	41		41		29		18	
sometimes	52	0.011	54	0.001	42	0.001	26	0.006
SELF-ESTEEM								
1. Nervousness								
daily	54		52		41		29	
weekly	48		45		30		19	
rarely/never	33	<0.001	38	<0.001	25	<0.001	14	<0.001
2. Self-confidence								
always	44		47		35		23	
often	39		38		25		15	
sometimes/never	41	0.033	41	0.004	28	0.001	17	<0.001
3. Acceptability								
always	45		45		34		22	
often	37		37		24		14	
sometimes/never	40	0.001	41	0.022	30	0.002	18	0.002
4. Body image								
too thin	48		46		40		24	
right size	41		42		28		18	
too fat	45		45		30		18	
don't think about it	38	0.007	42	0.475	30	0.001	17	0.045
5. Appearance								
very good looking	47		46		39		24	
quite good looking	40		41		26		17	
average/not good looking	40		43		24		15	
don't think about it	37	0.052	41	0.275	30	<0.001	17	0.003

any country in the latest HBSC study [55]. Countries with similar levels of consumption of sweets were Malta (54%), Scotland, and Ireland (46%), and for the consumption of soft drinks, Israel (52%) and Scotland (46%). Earlier results from different countries showed that boys consume soft drinks more often than girls, and girls consume sweets more often than boys [55–57], which was also true in this study. In many industrialized countries, children in the lower socio-economic groups consume more sugar-containing snacks than in the higher ones [20,57]. However, in Kuwait no difference was found and the overall consumption was high in all groups. Only Kuwaiti nationality (generally high socio-economic status) was clearly associated with frequent consumption.

Table III. Odds ratios (OR) and their 95% confidence intervals (95% CI) for more-than-once-a-day consumption of sugar products according to socio-demographic, life- and school-satisfaction and self-esteem variables among the intermediate schoolchildren in Kuwait, 2002/2003

	Sweets		Soft drinks		Cakes		All three products	
Variables	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender								
boy (ref.)								
girl	1.5	1.21–1.79						
Grade								
5th (ref.)								
7th			1.3	1.06–1.61			1.6	1.18–2.16
Nationality								
non-Kuwaiti (ref.)								
Kuwaiti			1.7	1.25–2.22				
Happiness								
not happy (ref.)								
happy					1.6	1.25–2.04	1.6	1.18-2.16
very happy								
Number of close friends								
none (ref.)								
1	2.2	1.38–3.49						
2	1.7	1.05–2.73						
3 or more	2.6	1.78–3.92						
Going to school boring								
rarely/never (ref.)								
sometimes	1.4	1.09–1.78	1.4	1.08–1.79			1.4	1.05–1.94
often	1.7	1.36–2.16	2.0	1.61–2.61			1.7	1.27–2.25
Nervousness								
rarely/never (ref.)								
weekly	1.4	1.03–1.79			1.6	1.07–2.11	1.6	1.17–2.26
daily	2.4	1.88–3.04	1.6	1.27–2.09	2.3	1.76–2.92	2.4	1.80–3.24
Appearance								
don't think about it (ref.)								
average/not good looking					1.8	1.34–2.40	1.5	1.09–2.14
good looking					1.9	1.44–2.49	1.8	1.28–2.48
very good looking					1.4	1.04–1.90	1.5	1.04–2.16

In this study, the personal indicators of children's life and school-satisfaction and self-esteem seemed to be far stronger predictors of the frequent consumption of sweets, soft drinks, and cakes than the socio-demographic, socio-economic, and school performance factors. The higher proportions of frequent consumers were also found among the children who felt nervous on a daily or weekly basis, or who often or sometimes felt going to school was boring. There also seemed to be a clear social gradient in the use of these sugar products, such that those who had more close friends, felt self-confident and very good looking, and were accepted by their classmates were more often frequent consumers of sugar products. Self-coherence theory therefore does not seem to apply in the case of Kuwaiti schoolchildren.

The characteristics of individuals who choose healthy/unhealthy lifestyles are important for an overall understanding of health behaviors [58]. After the Iraqi invasion (1990–91), eating habits in Kuwait rapidly changed to follow a more Western-style diet, with high sugar and fat content. This has also occurred in some southern European countries, such as Greece, where the eating habits of adolescents are in the process of changing from the traditional to the more Western [59]. In Kuwait, where the consumption of sugar products is common, the results have been contradictory, with both positive and negative factors concerning life and school-satisfaction as well as high self-esteem being associated with high consumption of sugar products. Different theories on health behavior have been tested when trying to change sugar consumption habits. When social learning theory was applied in school-based dental health education, positive short-term effects on dental health knowledge, attitude, and behavior were gained with improved food choices and with reduced consumption of high-sugar and high-fat snack foods [60,61]. The best results were obtained when peer leaders delivered the intervention. Health locus of control theory has

also been successfully related to change of dietary habits [62]. In studies elsewhere, the adolescents with a more internal locus of control and higher self-esteem seemed to have more health-promoting behavior than others [62], but the results of this study contradict these studies. There seems to be an urgent need to develop effective health education for Kuwaiti children who already have a strong internal locus of control, who have friends, who feel good looking, are self-confident, and are well accepted by their classmates. When this group of children are reached the peer group pressure could also affect those children who feel nervous, unhappy, lonely, and feel bored about going to school. In addition, as suggested by Freeman et al. [56], there is a need to empower and encourage adolescents to adopt positive self-care practices by increasing feelings of personal control over dental health and knowledge. Dental health education programs could be more health promoting if they are more pertinent to adolescents' affection than to their cognition [63].

The food habits of adolescents are strongly influenced by the behavior of their peers [32]. Consumption of sweet snack foods has also been shown to be associated with stress among adolescents [64]. Adolescents' food choice criteria, in general, have been shown to be taste, availability, and convenience, while sugar content and cost seem not to be so important [65,66]. Recently, in Kuwait, the number of special candy shops has increased greatly and consequently the quantity of different sugar products available has increased. Vending machines in schools and other public places are prevalent – all this enhancing easy access to the buying of sweet products.

This study reports the first nationally representative data on health-related behavior among schoolchildren in Kuwait. No attempts were made to confirm the validity or reliability of the answers to questionnaires. Since the results are based on self-reports about health behaviors, some reservations have to be taken into consideration when interpreting them; the truthfulness and accuracy of self-reports may be compromised because some health behaviors are difficult to recall and some are so sensitive that respondents may not want to report them [67]. In addition, adolescents might purposely under-report or over-report some health behaviors because they believe that engaging in these behaviors is socially undesirable or desirable [67]. Although correlations between self-reported data and objective measures in other studies have been found to be high among schoolchildren, some under-reporting does exist [67]. It is noteworthy that in the medical field in Kuwait, the Childhood Health Assessment Questionnaire has been used among rheumatoid arthritis patients and showed high reliability and validity [68]. To improve the reliability and validity of different parts of the questionnaire of the HBSC survey, several countries have conducted a number of separate studies concerning different variables between 1997–98 and 2001–02 surveys. The question concerning frequency of food intake was recently tested in Belgium among 11–12 and 13–14-year-olds, and the test–retest found reliability to be good for most food items; however, the lowest agreement was recorded for sweet consumption [69]. To measure validity, a 24-h food behavior checklist was included in the questionnaire and perfect agreement was found for consumption of sweets and soft drinks [69].

In conclusion, a national nutrition policy in Kuwait should be developed to highlight guidelines for a healthy diet. Owing to the very frequent consumption of sugar products and the lack of adequate prevention, a lifestyle change among Kuwaiti schoolchildren would be extremely important in preventing not only dental caries, but also other chronic diseases, such as obesity, cardiovascular diseases, and diabetes mellitus.

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