

Parents' Anxiety about Their Children's Consumption of Sugar or Sweets and Their Opinions Relating to Facts and Myths of Sugar Intake in Japan.

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ABSTRACT

Parents' worry about consumption of sweets by their children and their beliefs in the popular opinions regarding sugar intake were investigated. One thousand eight hundred fifty nine adults having elementary school students completed a questionnaire on their views relating to sugar. Results indicated that 91% of parents worried about consumption of carbonated soft drinks and 83% were anxious about sweet snacks and chocolates. Over 80% of the subjects agreed that sugar was a cause of dental caries, adult disease and was effective in improving fatigue. In Japan, it is commonly believed that high sugar intake acidifies blood and then dissolves calcium in bone. The myth of acidifying blood was believed by 40% and dissolving calcium was believed by 66% of the subjects. Parents who thought sugar caused attention deficit hyperactivity in children were 49%. Eight percent and 12% of parents agreed that sugar caused antisocial behavior in adulthood and juvenile delinquency in childhood respectively. Many parents worry about their children's consumption of sweets because of the many myths surrounding sugar. It is unfair to use these myths to prevent excessive sugar intake. Sugar intake reduction must be based on scientific rationale.

INTRODUCTION

From newborns to the elderly, most people prefer sweet tastes (1). In developed countries consumption of sugar or corn sweeteners is very high (2). Although people like sweetness, they feel anxious about consuming large quantities of sugar or sweet foods. Sugar has been blamed for obesity, diabetes, blood lipid abnormalities, cardiovascular disease,

gallstones, cancer, dental caries and behavioral disorders in the western world (3). Some professionals, including nutritionists, psychologists and physicians in Japan, also claim that sugar is associated with bone resorption because high sugar intake acidifies blood and then dissolves calcium in bone. This theory has no scientific rationale. They allege that sugar is a toxic substance. Their attitudes may affect the public's opinion on sugar and health.

Children like sweets in general, so many parents worry about the sugar consumption of their sons or daughters. Although excessive intake of sugar can be unhealthy, moderate consumption may be harmless. When one has no appetite due to extreme fatigue, sugar can be effective energy supplement. However, some people feel guilty occasionally satisfying a sweet tooth.

We studied Japanese parents' views on the sugar intake of their children to know the prevalence of many myths regarding sugar. Understanding parents' opinions could provide valuable information for making nutritional education programs on sugar intake. That sugar is to blame for bone resorption is a myth that is propagated only in Japan. However, it may spread to western countries in the future. This study may be useful in preventing the spread of mis-information between Western and Asian countries.

METHOD

A questionnaire method was used. Subjects were fathers or mothers having elementary school students living in Maebashi and Takasaki in Gunma prefecture, Japan. Subjects completed the questionnaire at their home. It was then brought back by their school children. The questionnaire was a paper-and-pencil instrument.

Of eighteen food items, 16 were sweet and 2 were salty. Parents were asked to respond to each of the foods according to their worries concerning their children's consumption. The questionnaire also included 18 facts or myths relating to sugar intake. They were then asked to respond to each statement by selecting on agree, undecided, disagree or can't answer. This survey was conducted from December to November in 1992.

Chi square tests were conducted on the responses.

RESULTS

Of the total sample of 1,859 parents sampled, 3.4% were fathers and 96.1% were

mothers.

Parents worry about consuming sweet confectionaries or beverages

Table 1 presents the percentage of parents who worry about their children's consumption of sweets. Food items in Table 1 were arranged in order of the degree of worry.

Parents worry most about the consumption sweet confectionaries or beverages. Carbonated soft drinks were particularly worrisome for parents (over 90%). Sweet snacks and chocolates worried over 80%. Parent's worry, however, was not limited to only sweets but also to salty snacks (82%). It seems that those are rich in sodium and fat, so many parents were anxious about intake. Although salty snacks caused parents a lot of worry, they worried little about "senbei" (19%), a traditional Japanese rice cracker rich in sodium but containing little fat. Parents' worry about ice cream, which is rich in both sugar and fat, was less than for soft drinks, chocolates or candy. "yohkan" and "manju" are very sweet traditional Japanese style confectionaries. Regardless of the sweetness, they caused worry in less than half the subjects because many elementary school students do not eat them regularly and have not acquired a taste for them.

Parent's opinion relating to facts and myths of sugar and sweets

Many facts and myths surround the consumption of sugar. They were arranged in order of the rate of agreement by parents (Table 2). Subjects were given a choice of four categories: agree, undecided, disagree and cannot answer.

Many people thought sugar is a cause of dental caries (88.6%) and effective in relieving fatigue (87.2%). People who thought excessive sugar intake results in adult disease were 81.7%.

When calorie intake is sufficient sugar consumption caused obesity, was agreed to by 77.7% of subjects. However, high sugar consumption does not cause obesity when calorie intake is insufficient. About 26% of the subjects agreed that high sugar consumption caused obesity if the total calorie intake was insufficient. It is very misleading.

In Japan, many people believe that sugar intake causes calcium to dissolve in bone (66%) . It has been spread by some professionals. They say that high sugar consumption acidifies blood and then dissolves calcium in bone to neutralize blood. For "sugar acidifies blood", only 39.7% of the subjects agreed but 42.2% of them could not answer. These myths relate to "sugar in milk cancels the nutritive value of calcium", 45.2% of the people agree to that.

The idea that sugar causes many behavioral disorders, such as attention deficits hyper-

activity, juvenile delinquency and antisocial behavior has been accepted widely by the American people(4). For sugar and hyperactivity, about half the subjects agreed to this. About 23% of the parents thought that if their children consume only a little they will perform well academically. In regard to sugar and criminal behavior, a small percentage agreed. A relationship between "sugar intake and juvenile delinquency" was agreed to by 11.5% and disagreed to by 49.5% of subjects. A relationship between "sugar and antisocial behavior" was agreed to by only 7.9% of the people but 32.7% could not answer.

The idea that sugar spoils nutrients in foods is often believed. This study has two questions of this type, one regarding calcium in milk and the other regarding vitamin C in grapefruit. Although 45% thought that sugar in milk cancelled the nutritive value of calcium, those who approved of the idea that sugar on grapefruit negated its vitamin C were only 25%. 30.2% could not answer.

That sweets were effective in reducing fatigue was felt by 87.2% and 44.5% agreed that sweets were effective in improving an irritable mood.

The myth that refined sugar is harmful but brown sugar is healthy was accepted by 37.5% of parents. We have no need to eat sugar if we eat enough of another carbohydrate like starch. The fact that we have no need to eat sugar was agreed to by only 7.6% of parents.

Belief of myths relating sugar affects parents' anxiety

Generally, parents hope that their children will perform well in school and not become juvenile delinquents. 116 parents (6.2%) agreed to both of the following statements, "You must give your child a little sugar if you expect him/her to perform well academically" and "Excessive sugar intake in childhood causes juvenile delinquency". This group has been called "Pro". The 427 (23.0%) who disagreed with both statements have been called "Con". The differences in regard to their worries about their children's consumption of beverages and confectionaries were examined (Table 3).

The degree of parents' worries was higher in the "pro" than in the "con" group for all items with the exception of dried fruits. The differences between the two groups regarding honey and "senbei" were not significant. They were significant from carbonated soft drinks to canned fruits. Higher degree of worry in the "pro" for salty snacks, which are not sweets, was indicated.

DISCUSSION AND CONCLUSIONS

Results of this study indicate that Japanese parents worry about their children's consumption of sugar or sweets, and they believe many of the myths surrounding sugar intake. Their belief in sugar related myths also affects their anxiety in regard to their children's consumption of confectionaries and beverages.

Carbonated beverages caused the most worry. The percentage of parents who worried about carbonated soft drinks was 91%. For non-carbonated soft drinks the percentage was 68%. Both beverages are sweet and if carbohydrate sweeteners are used, they contain the same calories. Therefore, the difference between these two drinks is only carbonation. As this study did not question the motivation of their worry, the cause of parents' anxiety regarding consumption was inferred. Many people may think that carbonated soft drinks cause dental erosion. However, the potential dental erosiveness depends on the titratable acid content of the drinks. Grenby(5) reported that pure citrus juices showed potentially the worst dental properties, followed by orange, with the least demineralization resulting from carbonated drinks. The high level of worry regarding carbonated beverages may be dependent on parents' general ignorance of the facts. If they worry about the dental erosive qualities of carbonated soft drinks, they should worry equally about non-carbonated drinks.

Parents' anxiety was not limited to only sugar or sweets but also included salty snacks. These are rich in sodium and fat. "*Senbei*", which is rich in sodium but contains little fat, was not so great a cause of worry as salty snacks. Therefore, it seems that parents are anxious about fat consumption. However, the level of parents' worry about ice cream was less than for non-carbonated soft drinks or candy. Both soft drinks and candy are high in sugar. Ice cream, however, has a high level of fat as well as sugar. If parents are anxious about fat intake, the percentage who worry about ice cream consumption should be higher than for soft drinks or candy. These results suggest that parents' worry lacks consistency.

In North America and Europe, one pervasive opinion about sugar is that it can cause hyperactivity and attention deficits in children(6)(7).

In Canada, responses to a mailed questionnaire indicated that more than 80% of 389 Canadian primary school teachers believed that sugar consumption contributes to increasing activity of normal children and 55% of all respondents had counselled the parents of children whom they believed to be hyperactive to consider reducing their child's sugar consumption to control the child's activity, and parents frequently did so(7). That sugar

and hyperactivity are related is believed by only about half the parents in Japan. This percentage seems less than in the Western world.

On the other hand, the myth that "sugar intake causes calcium to dissolve in bone" may be limited to Japan. Generally, Japanese people tend to have a slight calcium deficiency in their diet and milk is often recommended(8). Although many Japanese don't like milk, some of them can drink it if a little sugar is added. However, they hesitate to add sugar to milk because of their belief in the myths surrounding sugar and calcium intake. Large sugar intake is not desirable but a little sugar to improve milk palatability is no problem. This is an example of how myth may interfere with nutrition education.

This study also points out that belief in those myths relating to sugar affects parents' anxiety. Parents who agreed with both opinions; that sugar relates juvenile delinquency and that it has adverse effect on academic performance in school, worried more about their children's consumption of most food items than those who disagreed with both opinions. However, parents who believed in the adverse effects of sugar also showed a high level of anxiety regarding consumption of salty snacks.

The opinion that "sugar consumption is a causal factor in hypoglycemia" was not questioned because it doesn't seem particularly widespread and "hypoglycemia" is unfamiliar technical term.

Excessive sugar intake is not desirable. However, overeating any kind of foods or nutrients, even if they are essential nutrients such as protein, vitamins, minerals and dietary fiber, is unhealthy. The types of myths relating to sugar intake are diverse and widespread and may differ from country to country. Many factors, including cultural background, dietary habits, food supply and human behavior, affect the kind or content of such myths.

Finally, it is unfair to use these myths to prevent excessive sugar intake. Dietary education for general health should be based on scientific rationale.

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砂糖および甘味食品に対する学童を持つ親の意識

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自分の子どもが甘味食品を摂取することに対する懸念、および砂糖摂取に関連する事実と俗説に対する見解を、群馬県高崎市および前橋市に在住する学童を持つ1,859人の親を対象として調査した。炭酸飲料摂取を心配する親は91%に達し、83%の親が甘味スナック菓子やチョコレート類摂取を気にしていた。砂糖は虫歯や成人病の原因となり、疲労回復に有効であると信じる親は80%を越えた。日本においては、砂糖の大量摂取は血液を酸性にし、骨の中のカルシウムを溶かすという俗説が広く流布している。血液を酸性にする、カルシウムを溶かすという俗説を信じる親はそれぞれ40%および66%であった。砂糖は集中力を低下させると信じる親は49%であった。成人においては反社会的行動を、子どもにおいては非行をもたらす、に同意する親はそれぞれ8%および12%であった。砂糖の過剰摂取防止にこのような俗説を用いることは公正ではない。砂糖摂取量を減少させるには科学的に正しい知見に基づくべきである。

Table 1 Percentage of parents who worry about their children's consumption of beverages and confectioneries.

food items	worry	don't worry	no answer
carbonated soft drinks	90.9	7.8	1.2
sweet snacks	83.2	14.8	1.9
chocolates	83.1	15.5	1.3
salty snacks	81.7	17.3	1.0
candy	76.2	21.4	2.4
chewing gum	69.3	28.9	1.7
non-carbonated soft drinks	68.1	29.1	2.7
syrup	61.6	33.9	4.5
ice cream (in summer)	60.0	38.2	1.8
cookies, cakes	58.5	40.1	1.4
Yohkan* ¹	45.4	48.5	6.0
jam	39.8	56.9	3.3
Manju* ²	39.2	56.9	3.9
jelly, pudding	37.9	59.0	3.2
canned fruits(sweetend)	36.4	61.0	2.7
honey	19.6	76.8	3.6
Senbei (rice cracker)* ³	19.0	79.8	1.1
dried fruits	13.0	81.5	5.5

Base n is 1859.

*1:Japanese style confectionaries. Azuki beans are cooked softly and sugar is added, then gelled by agar. It's very sweet.

*2:Japanese style confectionaries. A bun with a bean-jam filling.

*3:Japanese rice craker with soy sauce.

Table 2 Parent's opinion relating to facts and myths of sugar and sweets. (%)

	agree	unde- cided	dis- agree	can't answer
Sugar causes dental caries.	88.6	6.0	4.5	0.9
When you are tired, your fatigue is relieved by consumption of sweet foods.	87.2	6.9	3.9	1.9
Excessive sugar intake causes adult disease.	81.7	6.9	6.1	5.2
High sugar consumption causes obesity when carorie intake is sufficient.	77.7	4.6	8.5	9.2
Sugar intake causes calcium to dissolve in bone.	66.0	8.7	12.3	13.1
Excessive sugar intake causes attention deficit hyperactivity.	48.9	16.9	15.6	18.6
Sugar in milk cancels nutritive value of calcium.	45.2	16.3	19.9	18.6
When you are irritable, your mood can be improved by consumption of sweet foods.	44.5	17.3	29.3	8.9
High sugar consumption acidifies blood.	39.7	7.7	10.4	42.2
Although refined sugar is harmful, brown sugar is healthy.	37.5	21.0	30.9	10.6
High sugar consumption causes obesity when carorie intake is insufficient.	26.4	14.0	33.9	25.6
Sugar on grapefruit negates its vitamin C.	25.4	11.7	32.7	30.2
You must give your child a little sugar if you expect him/her to perform well academically.	22.5	28.9	30.1	18.6
It is better not to eat sugar.	14.6	21.1	61.5	2.7
Excessive sugar intake in childhood causes juvenile deliquency.	11.5	20.0	49.5	19.0
As honey is good for beauty, a high intake is advisable.	11.3	25.4	58.9	4.5
Excess sugar intake in adulthood causes antisocial behavior.	7.9	16.5	43.0	32.7
We have no need to eat sugar.	7.6	6.8	81.1	4.6

Base n is 1,859.

Table3: The degree of difference regarding parents' worries about their children's consumption of beverages and confectionaries. The "Pro" group consists of those parents who agree with both of the following statements, "You must give your child a little sugar if you expect him/her to perform well academically" and "Excessive sugar intake in childhood causes juvenile delinquency". The "Con" group consisted of those parents who disagreed with both statements.

Food items (Base n)	Pro (116)	Con (427)	Pro/Con
	%	%	
carbonated soft drinks	96.6	88.3 **	1.09
sweet snacks	88.8	76.3 **	1.16
chocolates	87.9	77.0 **	1.14
salty snacks	90.5	74.7 **	1.20
candy	83.6	70.3 **	1.19
chewing gum	79.3	66.3 **	1.20
non-carbonated soft drinks	81.9	59.0 **	1.39
syrup	79.3	54.6 **	1.45
ice cream (in summer)	76.7	52.7 **	1.45
cookies, cakes	67.2	48.0 **	1.40
Yohkan	49.1	35.6 **	1.38
jam	55.2	32.8 **	1.68
Manju	42.2	31.1 *	1.36
jelly, pudding	51.7	30.2 **	1.71
canned fruits(sweetened)	56.0	29.0 **	1.93
honey	22.4	15.9	1.41
Senbei (rice cracker)	20.7	16.6	1.25
dried fruits	11.2	11.7	0.96

*, **: Significant difference between "pro" and "con" at $P < 0.05$ and 0.01 , respectively.