

Advertising of Toothpaste in Parenting Magazines

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Abstract We assessed advertisements for children’s toothpaste in two widely read US parenting magazines. Data on the number and type of toothpaste advertisements in two parenting magazines were collected from 116 magazine issues between 2007 and 2011. The number of children’s toothpaste advertisements per year and across magazines was computed. The amount of toothpaste presented in each advertisement was categorized. We noted whether the toothpaste advertisement stated that the toothpaste was fluoridated. We identified a total of 117 children’s toothpaste advertisements in these magazines and confirmed that the majority of the magazine issues contained at least one toothpaste advertisement. Of the 31 advertisements that depicted a picture of a toothbrush with toothpaste, all but one (96.8 %) depicted a full swirl of toothpaste covering the entire toothbrush head, which is well over the recommended amount. The pictures on the advertisements show an excessive amount of toothpaste on the brush, which directly conflicts with the instructions on many toothpastes and dentist recommendations. Those advertisements with photographs that depict a toothbrush with a full brush head of toothpaste are showing over four times the recommended amount for children.

Keywords Fluoride · Fluorosis · Parents · Toothpaste · Advertising

Introduction

While there are important public health benefits of fluoride for preventing tooth decay [1–3] excessive fluoride consumption, particularly among youth, can be dangerous. The risks of chronic fluoride ingestion include dental fluorosis, skeletal fluorosis of the bones, and kidney damage [4]. Fluoride ingestion in “low but excessive” quantities during tooth formation causes fluorosis. Fluorosis affects the “developing, un-erupted” permanent teeth of children younger than 6 years old, by creating white patches or mottling on tooth enamel [5] This not only increase the risk of decay, but adversely affects the cosmetic appearance of teeth, which in turn may have a variety of emotional consequences. One study of children with stained teeth noted feelings of embarrassment and worry about their teeth [6]. In the United States, from 1999 to 2004, 23 % of those aged 6–49 had fluorosis, with highest rates occurring among adolescents aged 12–15 (40.6 %), and children aged 6–11 (33.4 %) [7].

Excess fluoride intake can also lead to acute or chronic toxicity, depending on how much is ingested and how often the swallowing of fluoride occurs. Common acute toxicity symptoms include diarrhea, vomiting blood, and stomach pain [4]. Most severe effects of acute fluoride toxicity are convulsions, cardiac arrhythmias, and even deaths have been documented when a high amount of fluoride is ingested [2, 4, 5]. The lethal dose of sodium fluoride in a 154-pound (70 kg) adult is 5–10 g [4]. For children, the lethal dosage is 0.5 g of fluoride for children under 6 years of age and <1.0 g for children under 12 years of age [4]. The probable toxic dose of fluoride for a 6-year-old of

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average body weight is 95 mg [8]. Most toothpastes contain 0.24 % NaF (sodium fluoride), equal to 1,100 ppm, or approximately 33 mg F/oz. Using the American Dental Association's calculation tool [9], we find that a 4.6 oz tube of toothpaste with 0.24 % NaF has 152 mg of fluoride. A recent report from the American Association of Poison Control Centers indicated 21,513 calls in 2011 related to fluoridated toothpaste ingestion [10].

Topical and systemic fluoridation are the two main forms of fluoride ingestion. Fluoridated toothpastes are a common source of topical fluoride used regularly by children. Approximately 90 % of toothpastes sold in North America are fluoridated [5]. Adult fluoride toothpastes have a standard concentration of 1,000–1,100 parts per million (ppm) in the United States, with high-fluoride toothpastes having a concentration of 1,500 ppm [1]. Research suggests that children ought to use toothpaste with approximately 1,000 ppm of fluoride to effectively aid in the prevention of tooth decay [11, 12]. Specifically, the amount of fluoridated toothpaste a child should use is primarily dependent on: (1) the child's age (a direct indicator of the development patterns of the teeth) (2) children's general and varied lack of knowledge and experience with spitting during their oral care routine [13] (3) the child's oral hygiene (4) the child's diet [1, 2] and (5) the amount of fluoride in the child's drinking water [14]. Depending on the amount of carious lesions and plaque build up on and surrounding the child's teeth, recent research has suggested that a child's dentist should recommend use of fluoridated toothpaste, in the range of a "pea-sized" amount [3]; a child with a high caries risk should use slightly more fluoridated toothpaste than a child with lower risk [3].

Fluoridated toothpaste tubes often directly state that children 7 years old and younger should use a "pea-sized amount" [13, 15]. A "pea-sized amount" of fluoridated toothpaste is approximately 0.25 g (of toothpaste), whereas a toothbrush full of toothpaste is about 1.0 g [13]. A full brush head (1.0 g) of fluoridated toothpaste contains about 1.0 mg of fluoride [4], which is significantly more fluoride than the 0.25 mg of fluoride recommended by dentists for young children. Children sometimes use far more than the recommended amount of toothpaste [13]. The risk of excessive fluoride consumption is heightened among younger children because they also cannot effectively spit out while brushing their teeth [14]. Using the recommended "pea-sized amount" (0.25 g) of fluoridated toothpaste has been found to not only reduce the caries risk of younger children, but also to reduce the risk of dental fluorosis on the permanent teeth [13] and reduce risk of excessive fluoride consumption.

Although the Federal Trade Commission and the Food and Drug Administration have established clear rules and regulations regarding the marketing of health products, some misleading depictions on advertisements of

fluoridated toothpastes have been documented in the past [16, 17]. We did not identify any published recent research specifically on toothpaste advertising for children. We therefore assessed advertisements for children's toothpaste in two widely read parenting magazines, "Parents" and "Parenting," which have an estimated combined circulation of 4 million and an overall combined readership of approximately 24 million [18].

Methods

Data on the number and type of toothpaste advertisements in two US parenting magazines with high circulation rates were collected from 116 magazine issues between 2007 and 2011. A coding sheet was created and pilot-tested to document and describe certain aspects of toothpaste advertisements in each magazine issue. All of the magazines were coded by a single coder and all of the magazine pages and all advertisements were counted, excluding the front cover. An advertisement was defined as any announcement of goods for sale. The promotion by the magazines of certain products (denoted via "Editors Pick" or "Our Favorite Products") did not meet criteria as an advertisement and were excluded. If an advertisement spanned several pages, it was still counted as one ad. Instances where a magazine had a pull out or tear out promotion with coupons were not included in the final advertisement count.

The number of toothpaste advertisements per year, per magazine, and across both magazines, was counted. An independent sample one-tailed t-test was used to assess if toothpaste advertisement prevalence differed between the two magazine types. The amount of toothpaste presented in each advertisement was categorized as (1) "pea-sized" amount (in line with current dentist recommendations for children) or (2) toothpaste covering at least the full head of the toothbrush (these were mutually exclusive and exhaustive categories). We also made note of whether or not the toothpaste advertisement stated that the toothpaste was fluoridated. All data were warehoused and analyzed in SPSS (version 20.0).

Table 1 Mean (SD) number of toothpaste advertisements by magazine and year

Years	Overall (n = 116)	"Parents" (n = 60)	"Parenting" (n = 56)
2007	0.65 (0.83)	0.99 (0.29)	0.36 (0.51)
2008	1.30 (0.88)	0.78 (0.23)	1.27 (1.00)
2009	1.00 (0.95)	1.10 (0.31)	0.73 (0.30)
2010	1.00 (0.85)	0.89 (0.26)	0.64 (0.67)
2011	1.08 (1.06)	0.97 (0.12)	0.42 (0.67)

Table 2 Percentage of Advertisements with Fluoride Noted

	“Parents”	“Parenting”	Total
Yes, fluoride noted	47.0 % (n = 55)	22.2 % (n = 26)	69.2 % (n = 81)
No, fluoride not noted	18.8 % (n = 22)	12.0 % (n = 14)	30.8 % (n = 36)
Total	65.8 % (n = 77)	34.2 % (n = 40)	100 % (n = 117)

Results

Of the 116 magazines reviewed, over half (58.6 %, n = 68) had toothpaste advertisements geared toward children or parents of young children. Of these 68 issues, the majority (64.7 %, n = 44) were “Parents” magazine issues. A total of 117 toothpaste advertisements were computed across the 68 issues. The mean number of toothpaste advertisements over time and by magazine type is presented in Table 1.

Overall, a higher prevalence of advertisements is noted in 2008 and an increase in toothpaste advertisement prevalence is observed from 2009 through 2011. Further, notable differences in the prevalence of toothpaste advertisements between the two magazine types are also observed. The mean number of toothpaste advertisements in *Parenting* [mean = 0.68 (n = 56)] was significantly lower than in *Parents* [mean = 1.32 (n = 60)] ($t = 3.927$, $p < 0.01$).

Of the 117 toothpaste advertisements, 31 (26.5 %) included a picture of toothpaste on a toothbrush. Of these 31 advertisements, 30 (96.8 %) depicted a full swirl of toothpaste covering the entire toothbrush head. Only one advertisement depicted the appropriate pea-sized amount.

Fluoride While the majority of the toothpaste advertisements (69.2 %, n = 81) noted that fluoride was present in the toothpaste, almost one-third (30.8 %) did not (Table 2). Of the 31 advertisements depicting a full swirl of toothpaste covering the entire toothbrush head, nearly all (n = 30, 96.8 %) stated that the toothpaste was fluoridated.

Discussion

Given the large reach of the magazines included in this study, the potential for educating (or misleading) readers is great. Of the 31 advertisements that depicted a picture of a toothbrush with toothpaste, all but one depicted a full swirl of toothpaste covering the entire toothbrush head, which is inconsistent with current recommendations.

The pictures on the advertisements conflicts with the instructions on many toothpastes stating to only use a pea-sized amount. The power of a visual image versus printed information may result in children’s and parents’ use of toothpaste at levels higher than recommended, which may contribute to fluorosis, and in rare instances more excessive

fluoride intake. Popular parenting magazines can play an important role in helping adults make informed decisions about child health, but our results illustrate that this does not always occur.

Fluorosis is most critical between ages 22 and 25 months [19], emphasizing the importance of developing education efforts for expecting parents and parents of infants. Efforts such as prenatal classes and community-based health education programs to address the issue of children’s oral health in general and appropriate amounts of toothpaste use specifically are, therefore, necessary. Specifically, health education efforts that promote safe toothbrush practice habits (including using the correct amount of toothpaste, encouraging proper spitting, and minimizing swallowing [13, 20], and encouraging parent or caregiver supervision of young children [21, 22] may help promote healthy and safe long-term behaviors.

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