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Oral health information for Appalachia-West Virginia children: a cross-sectional analysis

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Abstract

Introduction—Time demands often impact the presentation of health related educational material/information in rural dental practices. The purpose of this study was to determine if parents/guardians were receiving information with respect to a child's dental needs, and if there were a relationship between the delivery of the information and the utilization of dental services in Appalachia-West Virginia.

Methods—A survey was presented to parents/guardians of Appalachia-West Virginia children [n=62] regarding dental information provided by their dentist/dental hygienist. The data were analyzed with Chi-square, and logistic regression.

Results—Summative score of the questions on the survey (Adjusted odds ratio=6.2 [95% CI=1.1, 35.4]; p=0.057), and parental education (p=0.057) remained associated in a logistic regression with a child having had a dental visit within the previous year.

Conclusions—Exposure of parents to dentally related educational material/information provided by a dentist/dental hygienist was independently associated with dental visits. The implication is that there remains a need for dental professionals to actively educate their patients.

Introduction

Researchers, using a large, national, representative data base, reported an increase in caries in young children in the US[1]. They reported that poor oral health remains an important

Authors' contributions

RCW and AKTS designed the project and collected data. RCW analyzed the data. RCW, AKTS, and RWP interpreted the data. RCW wrote the first draft. RCW, AKTS, and RWP revised the manuscript. All authors read and approved of the final manuscript.

Conflict of interest

The authors declare no conflict of interest with this manuscript.

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public health issue particularly for the young. Although dental caries is the most common chronic childhood disease, it has been reported that parents/guardians have not given significant attention to prevent the occurrence of caries at early ages [2]. Poor parental knowledge, attitudes and beliefs have been associated with dental caries in children [2]. Parental knowledge, attitudes and beliefs may influence the trajectory of oral health care throughout a child's life [2]. Additionally, the Surgeon General, in the Report on Oral Health in 2000, indicated that several deaths were associated with caries-related sepsis, and although the numbers are unknown, there are concerns that a number of deaths were associated with anesthesia for dental treatment [3]. Caries in children under age 60 months is a challenge in vulnerable populations, such as the poor and near-poor, where the dental caries prevalence approaches 50% [3].

Anticipatory guidance in medicine is the provision of information to parents/guardians to help them improve their children's development and determine potential special needs; it also involves encouraging the establishment of a medical home[4]. The aim of the approach is to intercede before challenges and poor habits develop or become permanent[4].

A similar approach is advocated in dentistry [4]. The early establishment of a dental home has been a hallmark of dental anticipatory guidance since the early 1980's [5]. Similarly, the encouragement of parents/guardians to have a child's first dental visit before his or her first birthday is a feature of anticipatory guidance to encourage and initiate healthful behaviors. Dentists and dental hygienists have important roles in the provision of relevant oral health educational material/information for primary prevention [6]. One study concluded that educational and preventive instructions provide very important means by which to reduce the risk of dental caries in children [7].

The objective of this study was to determine if parents/guardians of children in Appalachia-West Virginia report that their dentists or dental hygienists have provided dentally related information at their last visit, and to determine if there is an association of having received the dentally related information with the outcome of having taken their youngest child for a dental visit within the year. The rationale for the study is that there are 1] time constraints in dental offices; and 2] dental professionals and staff have more complicated and challenging duties than in the past resulting in the potential that dental education may be overlooked [8]. It is important to determine if providing dentally related information impacts behavior.

Methods

This study was approved by the West Virginia University Institutional Review Board (number 1402219898). Researchers conducted a survey of participants attending a health fair in a shopping mall. The survey was presented for the researchers to determine if parents/guardians were receiving information with respect to a child's dental needs, and if there were a relationship between the delivery of the information and the utilization of dental services. The inclusion requirements were that the participant was 18 years or above and that the participant was a parent/guardian of a child. No incentives were provided to the participants. Sixty-three parents/guardians were recruited, and 62 (98.4%) agreed to complete the short survey.

The survey included the behavioral outcome of interest: if the participant's youngest child had a dental visit within the previous year if the child was older than 6 months (no vs. yes).

The advice/information from the dentist/dental hygienist was assessed through 7 individual (yes vs. no) questions and through a summative score of the questions with a cut-point of 5. The questions were developed by dental professionals. The cut-point represented a score of 71%.

Additionally, demographic questions were asked about the participant's sex, education, race, age of the youngest child, and number of children.

The data were analyzed with IBM SPSS Statistics 21 software (IBM, Chicago, USA) for frequency/descriptive statistics. The data were analyzed with Chi Square test and logistic regression on dental visits.

Results

There were 62 participants in the study (Table 1). There were 34 (54.8%) females, 7 (11.3%) males, and 21 (33.9%) did not indicate sex. Similarly there were 36 (58.1%) participants who reported being white, and 26 (41.9%) who reported being black, other race, or who did not report race. The responses of Non-Hispanic black, or other races were aggregated with the category of not reporting due to the low response and potential for identification. There were zero participants with an education less than high school graduate, 12 participants (19.4%) who graduated from high school or earned a GED, 14 participants (22.6%) who had some college or technical school, and 35 participants (56.5%) who had a college, or technical school degree or above. There were 16 (25.8%) participants who had 1 child, 33 (53.2%) participants who had 2 children, and 12 (19.3%) participants who had 3 or more children. Considering the youngest child in the family, 7 [11.3%] participants reported that the youngest child had caries within the year and 13 [21.0%] participants did not have a dental visit within the year.

The items in the survey had a Cronbach's alpha of 0.837 and a mean inter-item correlation of 0.439. The mean summary score was 4.8 of a possible 7 (standard deviation=2.3).

The responses to the question concerning the information/advice given by dentists/dental hygienists are presented in Table 2. There were more than 60% of respondents affirming that dentists/hygienists had given information about the effect of sugary foods, drink, and sodas on teeth; that a soft-bristled brush should be used; that one should brush 2 times a day for at least 2 minutes; that an adult needed to brush a child's teeth until age 6 or 7 years, and that fluoride is added to the water supply to help remineralize teeth. Fewer than 60% of respondents reported being advised of the amount of toothpaste to use for a child's age, or that sharing food utensils has the possibility of transferring bacteria involved in caries.

The Chi-square relationships of the questions, education, number of children, and caries at the last dental visit are presented in Table 3. Significant associations were with education, advice to limit sugary foods, drink and soda, advice to brush 2 times a day for at least 2 minutes, advice for an adult to brush a child's teeth until age 6 or 7, and that fluoride is

added to the water supply to help remineralize teeth. There was also a significant association of the summative score and last dental visit.

The data were analyzed with logistic regression on dental visit. The results of the unadjusted and adjusted analyses are presented in Table 4. The variables, education and summative score (which were significant in the Chi-square analysis) were included in the adjusted logistic regression analysis using the method, enter. In the final model (model significance=.009; $-2 \text{ Log likelihood} = 46.727$), both education ($p=0.057$) and summative score ($p=0.041$) remained associated with a child having had a dental visit within the previous year. Compared with participants who had graduated from college or technical school or had a higher education, participants who had graduated from high school or had a GED were less likely to have had a dental visit for their children within the previous year. The adjusted odds ratio (AOR) was 2.5; and the 95% confidence interval (CI) was 0.4, 14.2 ($p=.309$). Participants who had some college or technical school had an AOR=8.6 (95% CI=1.5, 50.4; $p=.017$). Compared with participants who had a higher summative score, participants with a lower summative score were less likely to have had a dental visit for their children within the previous year (AOR=6.2; 95% CI=1.1, 35.4, $p=.041$).

Discussion

The results of this study were an association involving increased odds for an Appalachia-West Virginia child having had a dental visit within the year when dentists/dental hygienists present oral health information to parents/guardians at their last dental visit. Similar results from a study conducted in the United Kingdom support these results [9]. Although the researchers of that study used a different behavioral outcome, the researchers' results indicated that the provision of dental health education resulted in fewer caries in infants and young children [9]. The research concerning dental communication and behavior is limited, despite the awareness of the importance of providing oral health educational information to parents/guardians [10].

The researchers for this study found 81.6% of participants indicated that their dentist/dental hygienist addressed >50% of the items on the survey (a proxy of knowledge as indicated by the respondents remembering the items). Another study of maternal knowledge of causal and preventive factors in dental caries and gingivitis indicated that 83.4% had medium to high knowledge (>50%) [11].

Parents/guardians need to receive appropriate anticipatory guidance for their children, however access to parents/guardians is often problematic. Recent trends reported by the American Dental Association Health Policy Resources Center (based on 2011 data) were that 35% of the US population had a physician's visit, but did not have a dental visit; and 1 in 10 people visited his or her dentist but did not have an interaction with the rest of the health care system within the year [12]. As examples, there were 60% of children ages 1 through 4 years who visited a physician within the year, but did not visit a dentist; 25% of children 5–20 years who visited a physician within the year, but did not visit a dentist; 30% of adults 21–34 years who visited a physician within the year, but did not visit a dentist; and 46% of adults 65 years and above who visited a physician within the year, but did not visit a

dentist [12]. The Affordable Care Act will be transformational in its emphasis on interprofessional collaboration for disease prevention and measurable health care outcomes [12]. Dental messages will be delivered in medical settings. The provision of patient information will become very important, particularly with improved monitoring of quality of care (as it is in the UK) [10]. It is imperative that dental providers offer and reinforce dental knowledge to their patients. Dentists/hygienists as well as other healthcare personnel need to develop communication skills to improve the quality and amount of information to be given to patients so that they can understand and retain the message as well as increase satisfaction, compliance, reduce fear, and increase preferred behavioral outcomes, such as dental visits [10].

Future studies are needed to consider means by which to motivate and empower parents/guardians to behaviors which are pro-active in caries control. The researchers will need to consider the current status of dental education provided by dentists/dental hygienists to determine changes and appropriate interventions to improve children's oral health [13]. This study adds to the literature the benefits of routine discussions with parents/guardians in improving the dental visit frequency of the children of those parents/guardians. The study's sample size is an appropriate size for logistic regression with the independent variables of education and summative score, however if more variables were to be considered, the sample size would need to be increased. The study (cross-sectional) design is appropriate for the epidemiological evaluation of education provided and dental visit, however the design does not allow for the determination of causation or temporal sequence. For those items to be considered a randomized controlled trial would with an increased sample size would need to be designed and conducted.

Conclusion

Although it is difficult to determine the anticipatory guidance that parents/guardians need at any specific point in time, it is the dentist/dental hygienist's responsibility to help the parent/guardian to realize the intangible, long-term benefits of routine dental visits, and to give parents the ability to understand the best treatment options for their children [14].

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Table 1

Descriptive Statistics of the sample [n = 62]. There were 81.65% scoring at 50% correct.

	n	%
Sex		
Female participants	34	54.8%
Male participants	7	11.3%
Not reported	21	33.9%
Education		
Less than High School	0	0%
High School/GED graduate	12	19.4%
Some college/technical school	14	22.6%
College/technical school/above	35	56.5%
Not reported	1	1.6%
Race		
White	36	58.1%
Black, Other, or Not reported	26	41.9%
Number of children		
1	16	25.8%
2	33	53.2%
3 or more	12	19.3%
Not reported	1	1.6%
Youngest child had caries within the year		
Yes	7	11.3%
No	54	87.1%
Not reported	1	1.6%
Youngest child had a dental visit within the year		
Yes	45	72.6%
No	13	21.0%
Not reported, or child under age 6 months	4	6.5%
Mean summary score [standard deviation]	4.7	[2.3]

Table 2

Responses to the survey questions.

	Yes		No		Not Sure		Not answered	
	N	%	N	%	N	%	N	%
Did your dentist/hygienist ever tell you:								
-about the effect of sugary foods, drinks, and sodas on teeth?	41	66.1%	19	30.6%	1	1.6%	1	1.6%
-to use a soft-bristled toothbrush?	44	71.0%	17	27.4%	1	1.6%		
-to brush at least 2 times a day for at least 2 minutes?	55	88.7%	6	9.7%	1	1.6%		
-the amount of toothpaste to use for a child's age?	28	45.2%	33	53.2%	1	1.6%		
-that an adult needs to brush a child's teeth until age 6 or 7?	45	72.6%	15	24.2%	2	3.2%		
-that fluoride is added to the water supply to help remineralize teeth?	47	75.8%	12	19.4%	2	3.2%	1	1.6%
-that cavity-causing bacteria can go to a child by sharing spoons and forks with them?	33	53.2%	28	45.2%	1	1.6%		
I Summative score								
0–5 Positive Responses	32	51.6%						
6–7 Positive Responses			28	45.2%				
Missing			2	3.2%				

I The score values were from 0 [0% advice/information was given] to 7 (100% of the items were presented to the participant). They were dichotomized at 5.

Table 3

Pearson Exact 2-sided Chi-square analysis by dental visit within the previous 12 months.

	Yes	No	p-value
Education			0.010
High School/GED	9	3	25%
Some college/technical	5	6	55%
College/technical graduate/above	30	4	12%
Advised to limit sugary foods, drinks, sodas			.026
Yes	33	5	13%
No	12	8	40%
Advised to use a soft-bristled toothbrush			.085
Yes	34	6	15%
No	11	7	39%
Advised to brush at least 2 times a day for at least 2 minutes			.005
Yes	43	8	16%
No	2	5	60%
* Advised about the amount of toothpaste to use for a child's age			.122
Yes	22	3	12%
No	23	10	30%
Advised that an adult needs to brush a child's teeth until age 6 or 7			.009
Yes	38	6	14%
No	7	7	50%
Advised that fluoride is added to the water supply to help remineralize teeth			.005
Yes	38	5	12%
No	7	7	50%

	Yes	No	p-value
* Advised that sharing food utensils has the possibility of transferring bacteria involved in caries .119			
Yes	26	4	13%
No	19	9	32%
* Number of children .423			
1	10	5	33%
2	25	7	23%
3 or more	9	1	10%
* Presence of caries .320			
Yes	6	0	0%
No	39	13	25%
* Summative score of questions ¹ .049			
0–5 positive responses	22	10	31%
6–7 positive responses	23	2	8%

* cell(s) has/have counts fewer than the minimum expected.

¹The score values were from 0 [0% advice/information was given] to 7 [100% of the items were presented to the participant]. They were dichotomized at 5.

Table 4

Logistic regression on not receiving a dental visit within the previous year [n=56].

	Unadjusted		Adjusted	
	OR	95%CI	OR	95%CI
Education (p=0.057)				
High School Graduate/GED vs. college/technical graduate and above	2.5	0.5, 13.3	2.5	0.43, 14.2
Some College/Technical School vs. college/technical graduate and above	9.0	1.9, 43.7	8.6	1.5, 50.4
Summative score				
0-5 positive responses vs. 6-7 positive responses	5.2	1.0, 26.6	6.2	1.1, 35.4

Adjusted model Method=Enter; Model significance = .009; -2 Log likelihood = 46.727; CI=confidence interval