

Comparison of Saudi child versus parent-report of child tooth-brushing practices

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Abstract

Objective: This cross-sectional study compared Saudi children's tooth-brushing practices as reported by children and parents and then matched the agreement of reports.

Materials and Methods: A sample of 100 Saudi parents and their children of ages 8–12 years participated in this cross-sectional investigation. A self-administered structured questionnaire regarding the current tooth-brushing practice and habits at home was filled by the child. The same questionnaire was filled independently by parents.

Results: Mothers were more likely to teach children about tooth-brushing and fathers were minimally helping children during tooth-brushing. Mothers were the first to teach the children and approximately 33% of the children started brushing their teeth by age 5. Children and parents reported that children clean their teeth using a tooth-brush (73.74% and 76.77%), miswak (5.05% and 5.05%), or both (21.21% and 18.18%), respectively.

Conclusions: There was some agreement between reported tooth-brushing practice of children and their parents. It is important to question both the child and parent regarding oral hygiene practice and compare their answers to get more broad knowledge about their practices. Approximately, one-third of the children started brushing their teeth by age 5, which differs from recommended oral hygiene practices.

Key words: Dental plaque, oral health education, oral hygiene, patient education, tooth-brushing

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Introduction

Published research demonstrated that thorough daily plaque removal is important to prevent gingival and periodontal diseases as well as caries.^[1,2] Increased accumulation of dental plaque in the oral cavity directly reflects the lack of effectiveness of tooth-brushing.^[3] Proper tooth-brushing should

be established early in life because once learned, it is likely that this pattern will continue throughout life.^[4] However, although tooth-brushing appears to be an easy and efficient way of removing plaque, studies have shown that brushing time and performance of children are insufficient and change as they grow.^[5,6] Majority of children brush their teeth regularly, but for only 30–45 s.^[4,6] Depending on their manual skills and age, teeth may be inadequately cleaned.^[4,6] It was reported that the effectiveness of tooth-brushing is largely dependent on frequency of brushing, the design of the toothbrush, the patient's brushing technique, and the time spent in brushing,^[7] which is recommended to be brushing twice daily for 2 min.^[8,9]

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Contemporary model in health promotion such as tooth-brushing include not only education and increasing knowledge, but also require to implement a comprehensive perception and address several elements of oral health.^[10,11] Many factors can influence involvement in oral health-promoting activities such as dental knowledge, feelings, living conditions, attitudes, beliefs, and self-efficacy.^[10] It is critical to consider dental knowledge and self-efficacy of parents as low self-efficacy of caregivers was found to result in higher caries rates in their children.^[12] A study reported association of the tooth-brushing behavior and dental health of children with their mothers' positive oral health-related attitudes and recommended that the mothers should be a main emphasis of different professionals of oral health.^[13] Another study reported that the process of developing tooth-brushing habits of children is not a unilateral from parent-to-children process and it should be conceptualized as an ongoing interaction with bilateral power of influence from both parties.^[14]

One method for evaluating tooth-brushing habits of children is through direct observation, which is considered as the gold standard.^[15] Another commonly employed method is the utilization of information about children's tooth-brushing practices as reported by parents.^[15] One study found significant differences in the reports of mothers regarding the brushing practices of their children when the identical interview was repeated 6 years later, suggesting recall bias.^[16] Dependable data are essential for the dentist to assess risk elements for caries, so information of recall bias can weaken this process. For instance, frequency of tooth-brushing per day can be used to estimate the daily fluoride intake of the child from dentifrice.^[17] Hence, the excessive reporting of frequency of daily tooth-brushing leads to an over calculation of daily fluoride intake by children. It would be advantageous if information of tooth-brushing practices of children is collected from the patient/child as opposed to only parent-reported information and recall of a particular event to find more accurate data. However, there is a deficiency of studies evaluating whether reports of parents are similar to what is reported by their children. Consequently, a research question arises to evaluate the reliability of information collected from parents and children as follows: Is there agreement between reported children's tooth-brushing practices by parents and children? The null hypothesis tested: There is no difference in Saudi children's tooth-brushing practices as reported by children and parents. Therefore, this cross-sectional study compared Saudi children's tooth-brushing practices as reported by parents and children and matched the agreement of reports.

Materials and Methods

This study was approved by the Ethical Committee of Human Studies at the College of Dentistry Research Center of King Saud University. Participants of this study were a

convenience sample of 100 children and their parents who were recruited from patients visiting the pediatric dental clinic at King Saud University College of Dentistry for this cross-sectional questionnaire survey. The sample power for this study was 0.90 with sample size of 50 subjects. Inclusion criteria included Saudi children of both genders, ages 8–12, with no medical condition that causes impaired motor function (i.e., plaster immobilization, psychomotor diseases), cooperative children, and signed consent form by parents.

Demographic data of all children were collected. Parents were asked if and by whom their children were previously instructed on tooth-brushing. Study data were collected using a validated questionnaire with attitudinal items related to different aspects of the current tooth-brushing habits and practices of the child at home. This same self-administered structured questionnaire was filled independently by the child and parents. The questionnaire was composed of nine items. The questionnaire included questions regarding if and by whom the child got help with tooth-brushing, the time the child brushed his/her teeth, and what age the child started brushing alone. In addition, questions regarding the methods used by the child for teeth cleaning (tooth-brush or miswak or both) as well as the type of tooth-brush, whether the child uses fluoride toothpaste and whether the child spits after brushing were included. Participants were also asked questions about the use of tablet PCs and smartphones to plan their future use in educating children about tooth-brushing and oral hygiene.

Children and parents were supervised while undertaking the questionnaire. Assistance in completing the questionnaire was offered when needed by offering a structured interview with uniform prompts. Furthermore, children were asked if they use tablet computers and smart phones in their daily life.

The statistical analysis of the data was performed using SPSS 16.0 (SPSS, Inc., Chicago, IL, USA) for frequencies distribution of all questions in number and percentage to compare the answers between children and parents. The McNemar test was used to compare the reported frequency of the answers to the questions (level of significance set at 5%).

Results

Demographic data

100 parents and children (57 boys, 43 girls) enrolled in the study and none withdrew prematurely. The mean age of children was 10.5 (± 1.38 standard deviation) years and range was 8–12 years. Table 1 shows distribution of children by age. Some participants did not answer some questions and therefore missing answers was reported after each table and were not considered in the analyses. Children and parents

reported that 92 children (92%) were previously instructed on tooth-brushing. 57% and 41% of the children reported using tablet computers and smart phones, respectively, in their daily life.

Reported answers by children and parents

Table 2 shows frequency and percentage by which the instruction on tooth-brushing was given. Mothers were more likely to teach children about tooth-brushing as reported by children (57.61%) and parents (64.13%) ($P < 0.05$). Children and parents reported that 22 (22%) and 43 (43%) ($P < 0.05$) of the children were getting help during tooth-brushing respectively. Table 3 shows frequency and percentage of the person who helps the children during tooth-brushing. Mothers were more likely to help children during tooth-brushing as reported by children (86.36%) and parents (95.35%) ($P < 0.05$). In contrast, fathers were minimally helping children during tooth-brushing as reported by children (9.09%) and parents (4.65%). 98 (98%) children and 99 (99%) parents reported how many times the children brush their teeth [Table 4]. 99 children and 100 parents reported how many minutes the children brush their teeth [Table 5]. Approximately,

48 (48%) of the children were brushing their teeth for only 1 min. For reporting tooth-brushing only once daily, 22 (22.22%) children and 16 (16.16%) parents reported that children brush their teeth in the morning, 14 (14.14%) and 14 (14.14%) in the afternoon, respectively, and 63 (63.64%) and 69 (69.70%) at night, respectively. For reporting tooth-brushing before and after eating, 6 (6.12%) children and 1 (1.02%) parent ($P < 0.05$) reported that children brush their teeth before eating and 92 (93.88%) and 97 (98.98%) after eating respectively. 98 (98%) children and 99 (99%) parents reported the age when the child started brushing by himself or herself [Table 6]. Approximately, 33% of the children started brushing their

Table 1: Frequency and percentage of participant children by age

Age	Frequency	Percentage
8	11	11
9	17	17
10	15	15
11	25	25
12	32	32
Total	100	100

Table 2: Comparison of frequency and percentage by whom the instruction on tooth-brushing was given

Person teach tooth-brushing	Frequency		Percentage	
	Child	Parent	Child	Parent
Father	18	16	19.57	17.39
Mother	53	59	57.61	64.13
Dentist	16	10	17.39	10.87
Other	5	7	5.43	7.61
Total	92*	92*	100	100

*Only 92 participants answered this question

Table 3: Comparison of frequency and percentage of person who help children during tooth-brushing

Person help children during tooth-brushing	Frequency		Percentage	
	Child	Parent	Child	Parent
Father	2	2	9.09	4.65
Mother	19	41	86.36	95.35
Dentist	1	0	4.55	0
Total	22*	43**	100	100

*Only 22 participants answered this question; **Only 43 participants answered this question

Table 4: Comparison of frequency and percentage of how many times the children brush their teeth

Frequency of tooth-brushing	Frequency		Percentage	
	Child	Parent	Child	Parent
Once	71	66	72.45	66.67
Twice	22	29	22.45	29.29
3 times	5	4	5.10	4.04
More than 3 times	0	0	0	0
Total	98*	99**	100	100

*Only 98 participants answered this question; **Only 99 participants answered this question

Table 5: Comparison of frequency and percentage of how many minutes the children brush their teeth

How many minutes the children brush their teeth	Frequency		Percentage	
	Child	Parent	Child	Parent
One	47	48	47.48	48
Two	37	36	37.37	36
Three	15	15	15.15	15
More than 3 times	0	1	0	1
Total	99*	100	100	100

*Only 99 participants answered this question

Table 6: Comparison of frequency and percentage of the age when the child started brushing by himself or herself

Age	Frequency		Percentage	
	Child	Parent	Child	Parent
1	1	0	1.02	0
2	3	2	3.06	2.02
3	0	0	0	0
4	9	13	9.18	13.13
5	33	33	33.68	33.34
6	29	29	29.59	29.29
7	13	12	13.27	12.12
8	2	4	2.04	4.04
9	8	5	8.16	5.05
10	0	1	0	1.01
Total	98*	99**	100	100

*Only 98 participants answered this question; **Only 99 participants answered this question

teeth by age 5. For the question regarding use of the methods used by the child for teeth cleaning (tooth-brush or miswak or both), 99 children and parents reported that children clean their teeth using a tooth-brush 73 (73.74%) and 76 (76.77%), miswak (a teeth cleaning twig made from the *Salvadora persica* tree) 5 (5.05%) and 5 (5.05%), or both 21 (21.21%) and 18 (18.18%) respectively. 99 children and parents reported that children use soft-bristled brush 37 (37.37%) and 52 (52.53%) ($P < 0.05$) respectively. While 9 (9.09%) and 10 (10.10%) reported that children do not use soft-bristled brush and 53 (53.54%) and 37 (37.37%) ($P < 0.05$) respectively they do not know if they use soft bristled brush or not. Of the 99 children and parents, 37 (37.37%) and 72 (72.73%) ($P < 0.05$), respectively, reported that children use toothpaste which contain fluoride. While 9 (9.09%) and 7 (7.07%) reported that their children do not use toothpaste which contain fluoride and 53 (53.54%) and 20 (20.20%) ($P < 0.05$), respectively, they do not know if the toothpaste contain fluoride or not. 99 children and parents reported that their children spit after brushing 89 (89.81%) and 94 (94.95%), respectively.

Discussion

As comparisons of reported frequencies between children and parent in the present study were statistically different on some questions; therefore, the null hypothesis was rejected. Although this study's cross-sectional findings need to be confirmed by repeated research over longer time, the present study is one of the first to compare Saudi children's tooth-brushing practices as reported by children and parents and match the agreement of reporting. Actually reviewing literature did not find any similar research in other countries. The self-administered questionnaire used in the present study was filled independently by the children and parents and it was found that some answers for the same questions were different by them. Therefore, it is important to question both the child and parents regarding tooth-brushing practice and compare their answers to get more broad knowledge about their child's tooth-brushing practice. The present study used a questionnaire as a method of evaluating tooth-brushing practices of the participating children similar to the most widely employed methods, which include interviews and questionnaires.^[18,19]

Frequency and assistance during brushing

In the present study, 48% of the children were brushing their teeth for only 1 min which is much less than the recommended 2 min.^[20,21] Brushing twice daily for 2 min each assists in plaque removal and decreases risks of periodontal diseases and caries.^[8,9] In the present study, children and parents reported that 22% and 43% of the children were getting help during tooth-brushing, respectively. That is, children almost reported 50% less than parents. It is important to help children during brushing until their

manual dexterity allows them better tooth-brushing. It has been shown that parents have to brush their children's teeth at least until school age to ensure optimal oral hygiene.^[22] In this study, mother and father were more likely to teach the children's tooth-brushing. If this is the case, educating parents and improving their knowledge in oral hygiene may expand their oral health education and improve the oral hygiene of their children. Such education needs to be culturally appropriate in homes, schools, and clinics.

Timing of tooth-brushing

Approximately, one-third (33%) of the children started brushing their teeth by age 5, which is considered very late as it is recommended to start and implement oral hygiene procedures no later than the time of eruption of the first primary tooth.^[21] Children and parents reported that children brush their teeth in the morning 22.22% and 16.16%, in the afternoon 14.14% and 14.14%, and at night 63.64% and 69.70%, respectively. As only two-thirds of the children brush at night, it would be beneficial to encourage and emphasize to have the children brush their teeth at night before bed time.

Knowledge about oral hygiene practice

A large percentage of children and parents in this study reported that they do not know if the children use soft-bristled brush or fluoride toothpaste and that their children brush their teeth before eating 6.12% and 1.02%. The aforementioned oral hygiene practice and behavior highlights the importance of educating children and parents on appropriate oral hygiene practice. Health literacy has been defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."^[23] Health literacy should be considered in tooth-brushing practices as there is a strong correlation between health literacy and health status and the use of preventive services.^[24] Medical research supports the concept that low parental literacy levels may have detrimental effects on the health care of children.^[25] Parents or caregivers are primarily responsible for the oral health behaviors of children in their early years of life and therefore dentists should fully understand the parents' or caregivers' level of oral health literacy and its influence on their children's oral health. A cross-sectional study reported that caregivers of children with reported remarkable oral health status had a higher level of literacy and vice versa.^[26] Attempting to alter behaviors and practice of children and parents about the tooth-brushing practices may be enhanced by study of psychosocial influences and their bases is an encouraging area for future oral health research. It would be essential to recommend that children should be educated at an early age on the appropriate methods of proper brushing and oral hygiene.

Education of oral hygiene practice

In the present study, parents reported that 92% of the children were previously instructed on tooth-brushing. It has been suggested that interventions such as a handheld tablet PC or netbooks can be affordable devices that each patient can use individually.^[27] This particularly may be beneficial as 57% and 41% of the children reported using tablet computers and smart phones, respectively, in their daily lives. The high percentage of the children who use these devices, encourages their use in educating children about brushing and oral hygiene. Therefore, future research in tooth-brushing may develop an interactive media for tooth-brushing as health promotion for children needs to integrate more interactive and communicating media.^[28] The majority of children, including lower socioeconomic and minority children, use computers, play video games, and have cell phones and tablet PCs.^[28] Currently, children are attracted to new technology such as tablet PCs and smart phones and the use of such technology as teaching tools are increasing. Some studies have showed a progressive effect of using such new technology as teaching tool.^[29]

Limitations of the study

The present study has some limitations. The data collected were by self-reporting and participants may or may not have answered questions about tooth-brushing practice habits honestly. In addition, reports from participants can be biased because of forgotten past events or exaggerated reports of certain habits to appear alert about one's health. Furthermore, this study was completed in a single visit and a long-term follow-up must be completed to decide the consistency of answers regarding tooth-brushing practice habits. Some questions may have also confused participants as to how the child acts and what they believe. This could be a difficulty that can occur in surveys. For example, if a parent believes the correct time of tooth-brushing is 2 min, they may mark this option even if it is not the actual practice or behavior of the child. In addition, questionnaire items could reflect the knowledge of the respondents rather than their real behavior.^[30]

Conclusions

Within the limitations of this study, it is concluded that:

- There was some agreement between reported tooth-brushing practice of children and their parents
- Approximately, one-third of the children started brushing their teeth by age 5 years and one-half were brushing their teeth for only 1 min, which differ from recommended oral hygiene practices
- It is important to question both the child and parent regarding oral hygiene practice and compare their answers to get more broad knowledge about their practices
- Children and parents reported that only a moderate percentage of the children use soft-bristled brush and fluoride toothpaste.

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Conflicts of interest

There are no conflicts of interest.

References

1. Sharma NC, Klukowska M, Mielczarek A, Grender JM, Qaqish JA 4-week clinical comparison of a novel multi-directional power brush to a manual toothbrush in the reduction of gingivitis and plaque. *Am J Dent* 2012;25:14A-20A.
2. Taschner M, Rumi K, Master AS, Wei J, Strate J, Pelka M. Comparing efficacy of plaque removal using professionally applied manual and power toothbrushes in 4- to 7-year-old children. *Pediatr Dent* 2012;34:61-5.
3. Alm A, Wendt LK, Koch G, Birkhed D. Oral hygiene and parent-related factors during early childhood in relation to approximal caries at 15 years of age. *Caries Res* 2008;42:28-36.
4. Santos AP, Séllos MC, Ramos ME, Soviero VM. Oral hygiene frequency and presence of visible biofilm in the primary dentition. *Braz Oral Res* 2007;21:64-9.
5. Sayegh A, Dini EL, Holt RD, Bedi R. Oral health, sociodemographic factors, dietary and oral hygiene practices in Jordanian children. *J Dent* 2005;33:379-88.
6. Franzman MR, Levy SM, Warren JJ, Broffitt B. Tooth-brushing and dentifrice use among children ages 6 to 60 months. *Pediatr Dent* 2004;26:87-92.
7. Beals D, Ngo T, Feng Y, Cook D, Grau DG, Weber DA. Development and laboratory evaluation of a new toothbrush with a novel brush head design. *Am J Dent* 2000;13:5A-14A.
8. Jepsen S. The role of manual toothbrushes in effective plaque control: Advantages and limitations. In: Lang NP, Attstrom R, Loe H, editors. *Proceedings of the European Workshop on Mechanical Plaque Control: Status of the Art and Science of Plaque Control*. Chicago: Quintessence Publishing Co. Inc.; 1998. p. 121-37.
9. Straub AM, Salvi GE, Lang NP. Supragingival plaque formation in the human dentition. In: Lang NP, Attstrom R, Loe H, editors. *Proceedings of the European Workshop on Mechanical Plaque Control: Status of the Art and Science of Plaque Control*. Chicago: Quintessence Publishing Co. Inc.; 1998. p. 72-84.
10. Finlayson TL, Siefert K, Ismail AI, Sohn W. Maternal self-efficacy and 1-5-year-old children's brushing habits. *Community Dent Oral Epidemiol* 2007;35:272-81.
11. Watt R, Fuller S, Harnett R, Treasure E, Stillman-Lowe C. Oral health promotion evaluation – Time for development. *Community Dent Oral Epidemiol* 2001;29:161-6.
12. Reisine S, Litt M. Social and psychological theories and their use for dental practice. *Int Dent J* 1993;43 3 Suppl 1:279-87.
13. Saied-Moallemi Z, Virtanen JI, Ghofranipour F, Murtomaa H. Influence of mothers' oral health knowledge and attitudes on their children's dental health. *Eur Arch Paediatr Dent* 2008;9:79-83.
14. Goh EC, Hsu SC. Cross sectional: Bilateral parent-child interactions in school-age children's tooth-brushing behaviors. *Pediatr Dent* 2013;35:1-7.
15. Martins CC, Oliveira MJ, Pordeus IA, Paiva SM. Comparison between observed children's tooth brushing habits and those reported by mothers. *BMC Oral Health* 2011;11:22.
16. Martins CC, Ramos-Jorge ML, Cury JA, Pordeus IA, Paiva SM. Agreement between data obtained from repeated interviews with a six-years interval. *Rev Saude Publica* 2008;42:346-9.
17. Oliveira MJ, Paiva SM, Martins LH, Ramos-Jorge ML, Lima YB, Cury JA. Fluoride intake by children at risk for the development of dental fluorosis: Comparison of regular dentifrices and flavoured dentifrices for children. *Caries Res* 2007;41:460-6.
18. Aitken JF, Youl PH, Janda M, Elwood M, Ring IT, Lowe JB. Comparability of skin

- screening histories obtained by telephone interviews and mailed questionnaires: A randomized crossover study. *Am J Epidemiol* 2004;160:598-604.
19. Littman AJ, Boyko EJ, Jacobson IG, Horton J, Gackstetter GD, Smith B, *et al.* Assessing nonresponse bias at follow-up in a large prospective cohort of relatively young and mobile military service members. *BMC Med Res Methodol* 2010;10:99.
 20. Van der Weijden FA, Campbell SL, Dörfer CE, González-Cabezas C, Slot DE. Safety of oscillating-rotating powered brushes compared to manual toothbrushes: A systematic review. *J Periodontol* 2011;82:5-24.
 21. Clinical Affairs Committee, Guideline on Infant Oral Health Care - Clinical Guidelines American Academy of Pediatric Dentistry Reference Manual. *Pediatr Dent* 2015-2016;37:146-50.
 22. Clerehugh V, Tugnait A. Diagnosis and management of periodontal diseases in children and adolescents. *Periodontol* 2000 2001;26:146-68.
 23. Current Bibliographies in Medicine. Health Literacy. Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Library of Medicine, NLM Publication CBM 2000-1; 2000.
 24. Williams MV, Parker RM, Baker DW, Parikh NS, Pitkin K, Coates WC, *et al.* Inadequate functional health literacy among patients at two public hospitals. *JAMA* 1995;274:1677-82.
 25. DeWalt DA, Dilling MH, Rosenthal MS, Pignone MP. Low parental literacy is associated with worse asthma care measures in children. *Ambul Pediatr* 2007;7:25-31.
 26. Miller E, Lee JY, DeWalt DA, Vann WF Jr. Impact of caregiver literacy on children's oral health outcomes. *Pediatrics* 2010;126:107-14.
 27. Aronson ID, Plass JL, Bania TC. Optimizing educational video through comparative trials in clinical environments. *Educ Technol Res Dev* 2012;60:469-482.
 28. Baranowski T, Frankel L. Let's get technical! Gaming and technology for weight control and health promotion in children. *Child Obes* 2012;8:34-7.
 29. Tanaka PP, Hawrylyshyn KA, Macario A. Use of tablet (iPad®) as a tool for teaching anesthesiology in an orthopedic rotation. *Rev Bras Anesthesiol* 2012;62:214-22.
 30. Lencová E, Dušková J. Oral health attitudes and caries-preventive behaviour of Czech parents of preschool children. *Acta Med Acad* 2013;42:209-15.