Final Report to Funder- Children's experiences of receiving oral health advice from dental professionals and oral health behaviours: Focus groups with children aged 7-10 years.

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Lay Summary

Dental decay in children is a chronic yet preventable public health problem. Effective prevention for children requires the adoption of protective home-based toothbrushing and dietary behaviours from an early age. Dental teams have the opportunity to support parents and children to adopt these behaviours when they visit the dentist. These conversations are a three-way interaction between the child, their parents or caregiver and the dental team member. This is the first report of three looking at children's perceptions of these preventive conversations and how they can support home-based toothbrushing and dietary behaviours.

We aimed to explore children's experience of receiving oral health advice from dental health professionals, and explore their oral health knowledge and behaviours (e.g., toothbrushing and diet). We asked children, aged 7-10 years old, to discuss their experiences and then summarised these conversations into different themes.

- The first theme identified was the desire for a stimulating dentist visit, in which children expressed a desire for oral health advice to be delivered by dental professionals in a friendly way and in an interesting environment (e.g., colourful posters on wall). Simple changes in the behaviour of dental teams such as laughter and jokes were suggested rather than more authoritarian delivery style. For older children, how the message was conveyed

was important motivator, with oral health behaviours being seen as a responsibility entrusted to them rather than being imposed on them.

- The second theme was the child's awareness of oral health messages and knowledge of how to care for their teeth. Generally, children were aware of key oral health messages, suggesting these messages are being delivered. However, children identified difficulties with undertaking these behaviours especially remembering to undertake evening toothbrushing and the difficulty of refraining from sugary foods.
- Another theme identified was their motivation to look after their teeth. This motivation came from fear of the consequences of poor oral hygiene (i.e., dental decay) and the attraction that comes from using certain oral health products such as electric toothbrushes and phone apps which support brushing for children. Some children described how they were internally motivated and took personal responsibility in controlling their oral health behaviours.
- The final theme identified was the children's preference for certain oral health products. Children were very interested in using an electric toothbrush due to its novelty and ease of use, and the use of favourite fictional characters was particularly appealing on electric toothbrushes compared to manual toothbrushes or toothpaste as an electric toothbrush was seen as more of a prized possession. The use of other technologies such as phone apps and videos was also appealing to motivate and remind children to brush their teeth and to provide further education on the negative consequences of not looking after their teeth. The use of reward charts were seen as more appropriate for younger children, while careful selection of fictional characters is needed to ensure they appeal to older children.

In conclusion, from the children's point of view, advice delivered by a dental professional is more welcome when delivered in a friendly way within an attractive environment. Additionally, the clear pre-occupation with the use of electric toothbrushes and other technologies could be used to support the dental professional's advice, thus appealing to the children's' interests and so increase the likelihood of the oral health advice resulting in appropriate oral health behaviours.

Executive summary

We aimed to explore children's experiences of receiving oral health advice from dental health professionals, and their oral health behaviours using focus groups with children aged 7-10 years. We identified four key themes. These were: stimulating dental visits, awareness and implementation of oral health behaviours, motivation to change and oral health product preference.

Key findings:

- Stimulating dental visits: When discussing their preferences for dentist visits, children express desire for the visit to be stimulating, with an attractive environment, and for the dentist to be friendly rather than authoritative.
- Awareness and implementation: The children generally have good awareness of oral health messages, particularly those in the Delivering Better Oral Health toolkit. Specifically, they are aware of the message to brush at least once per day and one other time during the day, to brush last thing at night and not to rinse afterward. They are also aware of the need to brush for a minimum amount of time and to reduce the amount of sugar consumed. Although the message varies across all these factors the children do show awareness, suggesting the messages are being delivered.
- Awareness and implementation: The children also mentioned advice which is not included in Delivering Better Oral Health toolkit such as brushing in circles, drinking milk as beneficial to teeth and using an electric toothbrush. They are also unsure of when to brush (before or after breakfast), and indicated that the night time brush was more likely to be forgotten, but that charts and phone apps could help remind them.
- Awareness and implementation: All children were aware of the general instruction to avoid sugary food in their diet. However, it was hard for most to refrain from sugary food and many participants disclosed having sweets more often than recommended. Although there were a few who expressed controlling their diet, most spoke about how difficult it was for them to maintain it. They identified how they require the assistance of others, parents, to minimise their access to sugary foods and drinks and ensure they maintain a regulated and balanced diet.
- Awareness and implementation: Giving the children the responsibility for looking after their oral health is more appropriate for the older children as well as engagement

with apps for sugar content and checking their diet, and further information on the negative consequences of not caring for oral health. Rewards charts are more appropriate for younger children.

- Motivation to change: Motivation to care for oral health mainly came from scare tactics involving the negative consequences of not doing so, and from the use of attractive oral care products (e.g., electric toothbrushes and phone apps).
- Motivation to change: Overwhelmingly the children are interested in technology, demonstrated by the appeal and preoccupation with the electric toothbrushes and phone apps for toothbrushing and games and videos suggested for education.
- Oral health products: Children generally prefer electric toothbrushes compared to manual due to ease of use and functionality. Ownership of own electric toothbrush is prised as not disposable as manual toothbrush or toothpaste so they are more interested in them in terms of what characters are on them.
- Oral health products: The presence of characters on toothbrushes appeal more to the younger children whereas technology apps, games and function of the toothbrush appeal to the older children.

Introduction

Dental caries is a globally recognised public health problem (Kassebaum et al., 2015). In the UK, reducing caries prevalence in five year olds is a national priority and is included in the public health outcomes framework (Department of Health, 2012). Caries experience is acutely differentiated by social gradients (Wyborn et al., 2012). In England, the contrast is stark; at three-years-old, caries prevalence varied between 2% and 34% for different local authorities (Public Health England, 2013). This variation widened further by five-years-old, from 14% to 54% (Public Health England, 2016). Caries in the primary dentition is the strongest predictor for caries in the permanent dentition (Hall-Scullin et al., 2017). From a young age children with and without caries are set on very different oral health trajectories which dramatically separate across the life course (Hall-Scullin et al., 2017, Broadbent et al., 2008). Consequently, Public Health England and the National Institute for Clinical Excellence strongly advocate preventing caries in young children (Public Health England, 2014, National Institute for Health and Care Excellence, 2014).

In England, treatment of caries is the most common reason for young children (over 30,000 children) to have a general anaesthetic; this alone costs the NHS £36 million a year (Public Health England, 2014). The burden of caries is significant. Caries causes pain and suffering as well as changing what children eat, their speech, quality of life, self-esteem, and social confidence (Public Health England, 2014). Moreover, it has a wider societal impact on education and social participation (Public Health England, 2014). Treating caries accounts for a significant proportion of the £3.4 billion annual spend on NHS dentistry (Public Health England, 2014).

A number of behaviours are associated with the development of caries in children. The two key behavioural risk factors are poor oral hygiene and the consumption of sugars, more explicitly consumption of sweets and infrequent toothbrushing along with accumulation of plaque are associated with poor dental health (Mattila, 2005). Despite this, caries is a preventable disease, with modifiable target behaviours, recommended to reduce their prevalence and ensure good oral health, including twice daily toothbrushing with a fluoride toothpaste (Marinho et al., 2003) and reducing the amount and frequency of free sugars consumed (Moynihan, 2005).

In order to reduce caries incidence in children, both children and parents need to be aware of these behavioural risk factors, and key oral health promotion messages. One route through which children and parents receive advice on oral health is through general dental practitioners, within a dental setting. An evidence-based toolkit for supporting dental teams to provide appropriate evidence based oral health advice has been developed by Public Health England entitled "Delivering Better Oral Health" (Public Health England, 2017).

All general dental health practitioners and their wider team deliver oral health advice to children and their parents in some way, but there has previously been no exploration of how these messages are received and understood, and how they subsequently influence oral health behaviours. For children, these preventive conversations are a three-way interaction between the child, their parents or caregiver and the dental team member. Parents have responsibility for enforcing good oral health behaviours in their children, in order to prevent dental caries with children taking on more responsibility as they grow older.

Within this project, we aim to explore the experiences of oral health promotion within a dental setting from the perspective of dental practitioners as deliverers, and parents and children as receivers of the advice. We aim to gain understanding of dental practitioner's experiences of delivering advice to children and parents, and the experiences of both children and parents when receiving this advice, and how the messages influence oral health behaviour. The current report explores the experiences of the children themselves with regards to the oral health advice they have received or are aware of, and their oral health behaviour. We used focus groups to explore these factors with primary school children between the ages of 7 and 10 years.

Methods

Ethical Approval

Ethical approval was obtained by the Departmental Research Ethics Committee (DREC), University of Leeds. Ref: 300317/PD/225

Participants and Sampling

Children from three different schools were invited to join the focus groups. School 1 and 2 are located within a couple of miles of Bradford city centre. School 3 is located in a rural countryside area outside of Huddersfield town centre. The catchments areas of these schools vary with children attending School 1 living in the top 10% of most deprived neighbours in England, School 2 in the top 30% of most deprived neighbours in England and School 3 within the 30% of most affluent neighbours in England.

In discussions with the headteachers, different year groups were chosen to participate. This included two year 3 forms (aged 7-8 years old), one year 4 form (aged 8-9 years old) and two year 5 forms (aged 9-10 years old). Owing to the time of year the focus groups were undertaken, younger and older children were preparing for national exams and were not available to partake in this research.

For each school, the parent information sheets were distributed to parents at least 5 days before the proposed focus group. In order to participate, parents had to complete the consent form thereby allowing their child to participate. For each class, children were split into groups 6-8 and allocated to a member of the research team. The research team member would then undertake the focus group in the classroom setting. A topic guide and oral health resources provided by Oral B were used to facilitate the conversation. The focus groups were conducted as part of the normal school day and were audio recorded.

Analysis

Focus groups were audio-recorded and professionally transcribed in verbatim in order to reflect accurately on the conversations and reflections after the event. Thematic analysis of the transcripts was used which involved ‘careful reading and re-reading’ (Rice and Ezzy, 1999: 258) of research material to identify the main themes. Alongside the pattern

identification within the data (Fereday and Muir-Cochrane, 2006), individual or unique cases were noted down. The interviews were repeatedly read, aiming to find commonalities or contradictions among the unique and dominant cases. This was carried out by one researcher (RD) in collaboration with other members of the research team. Sub-themes and overarching themes were subsequently developed and refined by discussion between the research team. All key themes were then reviewed, and redundant themes explored and discounted as appropriate. Final themes were agreed and named and the report produced as a collaborative work between members of the research team. Negative case analysis was also undertaken.

Analysing the children's focus group interviews entailed taking care and acknowledging confabulations and exaggerations in their responses which may be due to peer pressure, desire to impress the interviewer or even misunderstanding the question. Often to impress their fellow classmates or to add something to what the participant before him/her said, some children were found to give responses that were unlikely to be true. For instance, one of the children said that the dentist advised using 'loads of toothpaste'. There is a possibility that the child said this because he/she felt that it was the right thing to do. It could also be because he/she felt that he/she should add to the ongoing conversation even though he didn't remember or was never advised about how much toothpaste to use. In this way one could be confabulating information just to be part of the topic of interaction or impress and/or better their fellow classmates.

Some also seemed to be exaggerating certain parts of the information like (i) the amount of time spent in brushing, (ii) the amount of time the dental team spent providing advice or (iii) diet control especially regarding sweets. For instance, some said they "did not eat any sweets at all". There were others who said they brush for 15-20 minutes again a situation which is highly unlikely to be true. Similarly, when asked how long the dentist spent in advising them, some said 'half an hour'. This is again an unlikely situation, but it is hard to ascertain whether they were exaggerating to impress their peers or if they do not have enough understanding of time needed to accurately estimate how long they spend brushing or receiving advice from the dentist.

Overall, given that some of the responses were suspected of being false, they were not brought into the analysis. There were other responses that had to be interpreted to some extent so as to link with the research question, understanding some of the barriers and facilitators of good oral health practices.

Results

Four themes were obtained from the analysis of focus group interviews undertaken with children aged 7-10 years old:

1. Stimulating dentist visit
2. Awareness and implementation
3. Motivation to change
4. Product preferences

Theme 1: Stimulating dentist visit

Going to the dentist is often perceived as something that is frightening and for some a dull and 'boring' experience. When the participants were asked, 'What's the best thing about going to the dentist', various responses were obtained, some that were common and others that were unique and specific to their treatment experience.

Getting stickers was often the first response given when asked what they liked best about going to the dentist. Participants from all the school years interviewed (year 3, 4 and 5) excitedly talked about getting stickers in their clinic visit. The following is an extract from an interview with children in Year 3:

> I: So what's the best thing about going to the dentist?
>
> P1: You get stickers
>
> P2: It's fun
>
> I: Why is it fun?
>
> P2: Because there's… because they give me stickers and sometimes they tell jokes when I come to the dentist.
>
> P3: They tell you how to keep your teeth clean and how to keep them safe

Getting stickers was associated with 'fun' just as sharing jokes in the clinic. The fun element was desirable for most participants and is potentially a stimulating factor for them to visit the dentist. Not all participants were motivated to go to the dentist to learn how to take care of their teeth. It was essential that they had something attractive available at the dentist which they could look forward to when visiting the clinic.

When asked for their opinion about what could be done better by the dentist so that they listen to the advice, some participants shared examples of how the clinic could be made more attractive and how the way of advising could be changed:

> like it could be... the walls could be more colourful and they could explain it more nicely because when I go to the dentist, they always shout at me [...] like they just say in a strict way like 'you have [stresses the word] to...'. I want it to be more like nice, like more giggly. (Year 4 participant)

In another focus group with Year 5 children when asked the same question about what could be done better for them to listen to the advice, they said:

> P1: Song way [starts singing a song related to teeth and diet]
>
> P2: TV inside the dentist's office

Using light tones and attractive environment could make going to the dentist less intimidating and more welcoming. What is important for children is that they find going to the dentist not just informative, but also appealing. Just like stickers added a fun element to their visit to the dentist, colourful walls could similarly give visual cues that could make going to the dentist less 'scary' and more enjoyable. Although there were some participants who seemed excited to know more about their teeth and how to take care of them, the means and ways of delivering that advice could be altered to make it sound less of an imposition and more as a responsibility entrusted on them, thus giving a sense of authority. Additionally, it is essential that the communication takes place between the dentist and the child as much as with the parents. In this way the child may feel important and take their responsibility seriously.

<u>Theme 2: Awareness and implementation</u>

Children from all the three years shared their insight and knowledge about how to take care of their teeth. Both brushing and dietary advice were absorbed and remembered by most children when asked the question of what the dentist advised.

> I: What advice were you given by the dentist about taking care of your teeth? [question asked to a group of Year 3 children]
>
> P1: Brush in circles
>
> P2: Healthy eating and make sure you brush your teeth twice a day

P3: They just said eat healthy food and brush twice a day

P4: Brush your teeth and brush them for long, but not that long

The above extract suggests that most children were informed of what to do to take care of their teeth in which some gave more details than others especially when asked specific question about brushing and diet.

I: Did the dentist tell you anything about brushing your teeth? [question asked to a group of Year 4 participants]

P1: The dentist said to me to use an electric toothbrush and don't use the battery ones because you will have to keep buying batteries

P2: The dentist said I have to wash three times a day – one at night, one in the morning and one in the middle of the day

P3: The dentist said that I have to brush my teeth for two minutes and use loads of toothpaste

P4: The dentist said to brush for three minutes till it's really, really clean

P5: My dentist looked at the X-ray and said, 'You should really get out of the habit of having sugary food'.

Similarly when the interviewer asked, 'What did the dentist say about diet' to a group of Year 3 children, their responses were:

P1: Sweets. You shouldn't eat sweets.

P2: They said you shouldn't eat sweets for at least an hour after you brush your teeth

P3: Can't remember

P4: My dentist said that I should eat apple and healthy food

P5: You shouldn't eat chocolate cake, but you can drink milk because it helps your teeth

P6: My dentist told me to keep on a balanced diet

Other focus group interviews with children also revealed their presence of knowledge about maintaining sugar free diet and most were informed about avoiding chocolates, sweets and fizzy drinks. There were also others who remembered getting specific advice about using mouthwash:

P: They also said, ‘Do you use mouthwash?’. I said yes and they said, ‘Do you use after you brush your teeth’, I said ‘yes’ and they said to me, ‘Don’t really do it. If you brush your teeth in the morning, then come back from school and do it, not after you’ve brushed your teeth’.

I: Did they explain why?

P: They said it’s like water. It takes the toothpaste out of your mouth. (Year 4 participant)

The participant was well informed about the use of mouthwash and without any specific question asked about it she remembered and explained it well to the interviewer.

All the above extracts suggest that participants had the awareness and knowledge about how to take care of their teeth. However, there were a few barriers that were identified in bringing effective behavioural change at home related to maintaining good oral health. Table 1 lays out the advice given, barriers and facilitators associated with good oral health practices.

Table 1.

Advice, barriers and facilitators of maintaining good oral health informed by interviews with children

Advice	Barriers	Facilitators
Brushing essentials -brushing at least twice a day, once in the morning and once at night -brush in circles -make sure it reaches every corner of the mouth	Difficult to remember to brush, especially at night Not all were shown how to brush, only verbal advice given Unsure of morning brushing time – before or after breakfast	Parents as reminders Using apps and charts Videos Attractive products Set alarms or paper reminders Clear instructions need to be given about the morning brushing time
Avoid sugary food	Difficult to avoid Unaware of products with hidden sugar content	Informed through charts and other displays in the clinic Sugar apps Reward system reducing frequency of sugary food intake Self-experimentation

In the following section, we discuss the barriers and facilitators to the implementation of two primary advice – brushing essentials and avoid sugary food.

Brushing essentials: As mentioned earlier participants seemed to have the knowledge about how many times to brush and most even talked about the amount of toothpaste they were advised to use. However, at the same time some participants expressed difficulty remembering to brush, especially at the night time:

P: They said I have to brush in the morning and at night

I: Which one were you forgetting?

P: The night

I: Did they give you anything to remember to brush at night?

P: They said, ‘Your mum’s going to remind you at night’. (Year 4 participant)

Morning routines were easier to remember because it is the first thing they are meant to do and they often get habituated to brushing in the morning as part of their daily routine. However, the same does not hold true for the night time. This might be because the routine tends to be less rigid in the evening than in the morning when they have to get ready to go to school.

Different methods were suggested by the children when they were asked for their opinions about how they could remember to brush. Some suggested using reminders in their rooms:

I: How do you remember to brush twice a day?

P: They gave me a picture of a toothbrush and toothpaste and said, ‘Brush always twice a day’

I: Where did you put that to remind you?

P: In my bedroom (Year 3 participant)

Similarly participants from other focus groups suggested putting notes on places that they felt would be useful to remind them of brushing:

I: How can we remember to brush our teeth?

P1: Like in the fridge you can have a reminder or something

P2: I have a little note [...] upstairs

P3: When I go to the toilet, it reminds me

P4: If you had a chart and then you get something (Year 3 focus group participants)

It was also the expectation of a reward that helped them remember to brush. Some participants talked about maintaining a checklist for brushing in the morning and at night and if they followed the regular brushing routines they were rewarded at the end:

They told my mum to make a chart for when I brush my teeth and if I do it for like a whole week, I can get a prize

Some suggested using phones and apps to remind them to brush:

I: What are the ways you can remember the information given by the dentist?

P1: Write all the information in a diary

P2: You could set a reminder on your phone. A loud noise.

Another participant talked about an application that helped her brush twice a day:

P: Because I can't keep track of time, I use the Aquafresh time app [...] Because of the app that I've got, I set my bed time when I wake up on my phone and every time I wake up, it says – Time to brush your teeth—and I wake up and go to the bathroom and do it.

I: Does it make you do it?

P: Yes, and sometimes when I'm tired and go to bed, it makes this really loud noise and says – time to brush your teeth (Year 4 participant)

There was a tone of excitement when the participant talked about the "app". Furthermore, when the question was framed as – 'what can the dentist do so that you remember to brush your teeth', the responses were:

P1: Give us like a leaflet

P2: I was going to say leaflet

P3: Give us a video

P4: Well they told me to go online and read about teeth

P5: My dentist asked me to ask my mum to get a... this special website. So then I can see all of the things about teeth and watch videos and play games about teeth

P6: The dentist told me to play games about teeth. I have played a game, a game where you have to sort the teeth out. So you have to put the teeth in different positions in the same spot and then you'll have to clean them and then if they get dirty again, you'll have to fix it back up.

P7: You could give a toothbrush that can talk (Year 3 participant)

The above extract gives some interesting insights on what the dentist could do to make sure children remember to brush their teeth every day. Leaflets are already used by most dentists to give information about dental care. However, if they could provide such leaflets for children with attractive colours, characters and other pictures giving also the information in simple language for the child to understand, it could help them remember to brush. For instance, using vibrant colours and making comics with popular characters could capture children's attention. They could also use them as posters in their walls just like reminders that some used in their bedrooms, bathrooms and fridges.

Another way of remembering as suggested by three of the participants in the above extract is the use of videos and games. These could be a productive source of increasing sensitivity towards oral health and thus serve an educational purpose while also making them care about their oral health. For instance, the sixth participant in the above extract talked about this game where you arrange the teeth, put them in the correct places in the mouth and then clean them. If not cleaned regularly, the player has to repeat the process again. This delivers the simple information that teeth ought to be kept clean and failing to do so could cause it to fall out. In the same way, watching videos about oral health could also increase their awareness and sensitivity towards it:

> At home I typed in my iPad how to keep your teeth healthy and it showed me how to keep your mouth healthy (Year 3 participant)

For children who feel internally motivated to take care of their teeth, would often voluntarily look for videos and some reported what they learnt from it ('So I Googled. I saw what bacteria looks like and it is really disgusting', Year 3 participant). Dentists could suggest watching videos and recommend those that would provide additional information to what they advise in the clinic. This could give them a sense of responsibility and at the same time impart useful information about better oral healthcare practices.

Although participants suggested different ways by which they could remind themselves to brush, parents played a major role in integrating a routine brushing habit. When asked whether they were supervised by their parents while brushing, most said that they were only supervised when they were younger. However, their parents still reminded them regularly to go brush their teeth, especially at night. It is essential that parents remember to make sure that their children brush their teeth at least twice a day till it becomes engraved in their daily

routine. The ways children attempted to remind themselves could be used as an additional method, also giving them a sense of responsibility to take care of their teeth.

Not everyone was given a demonstration of how to brush their teeth. Most were only given verbal instructions about brushing or used other resources like leaflets and website recommendations. As mentioned earlier, those children who were sensitive about their oral health watched videos online to know more about how to take care of their teeth and in this way taught themselves how to brush, but this may not be applicable for all children. Thus, it is essential that oral health care professionals spend the requisite time to make sure they understand how to brush their teeth apart from directing them to videos and online sources of information.

Another issue associated with brushing was the lack of clarity about whether to brush before or after breakfast in the morning. In one of the focus group interviews (with Year 3 children) participants debated about this, one of them said, 'You should brush after breakfast because you have food stuck in your teeth'. They were not always informed the significance of brushing and what role it plays in preventing dental caries.

When the participants were asked about what advice they were given, none spoke about the timing of brushing. They were informed about brushing in the morning and at night, but they were not given specific information of whether to brush before or after food. Most knew about brushing after food at night, not because they were informed about it, but they assumed so based on their own logical understanding that food stuck in their mouth ought to be cleaned out. The same logic was used by many for the morning routine. The emphasis was on cleaning and not on the protection toothpastes provide from rotting. This suggests that there is a need for specific instructions from the dental care professional with explanations of the importance of brushing and the role it plays in both cleaning and protecting the gums and teeth.

There are, overall, the following things essential to be integrated in the advice about brushing:

(i) the number of times to brush,
(ii) how to brush with demonstration
(iii) demonstrate missing bits while brushing (by using fluoride varnish)
(iv) explain when to brush (before or after food)
(v) amount of toothpaste to use

(vi) explain the overall role played by brushing in preventing caries

Avoiding sugary food: All participants were aware of the general instruction to avoid sugary food in their diet. However, it was hard for most to refrain from sugary food and many participants disclosed having sweets more often than recommended. Although there were a few who expressed controlling their diet, most spoke about how difficult it was for them to maintain it:

I: Do you actually follow all the diet advice?

P1: Sometimes

P2: It's a little hard

P3: Because it's really hard to get out of it (Year 5 participants)

One of the participants in another focus group said, 'It's hard to follow because almost everything has sugar'. These responses suggest that although they had the awareness of the kind of diet they are supposed to maintain, they often found it hard to regulate it and hence require the assistance of others to make sure that they have less access to sugary food and maintain a regulated and balanced diet.

Scare tactics also worked for many in reducing sugary diet. Participants from all the year groups talked about the repercussions of not following the advice given by the dentist. The following is an example from a focus group interview with a few Year 4 participants:

I: We have been talking about brushing. What else causes holes in your teeth?

P1: Too much sweets

P2: If you've been drinking fizzy stuff, you can have cavities and if you're still eating, the cavities will rot and you'll have a hole in it

P3: We did some experiments in school and found out that juice and chocolates make the tooth go rot because it's got sugar in it

Most participants had the awareness of the association between sweets and cavities and this helped some refrain from sugary food. In the above extract, the third participant spoke about experiments that they had conducted in school to test sugar in food and drinks. This could be a useful method of gaining knowledge about hidden sugar in some foods and drinks, and children are, at the same time, likely to remember. Such experimentation could give a sense of discovery and could potentially ignite their interest in knowing more and also

implementing a change in behaviour to reduce sugar intake. This can be done in different schools to raise awareness and bring effective behavioural change.

Furthermore, when dentists use scare tactics, they are more likely to be taken seriously than if communicated by parents. The following is an example from a Year 3 focus group interview:

> I: Why do you listen to the dentist?
>
> P1: Because dentists help your teeth... keep your teeth and keep them clean. If you don't listen to them, your teeth will get black
>
> P2: If you don't listen to them, your teeth will go all wonky and you will have cavities and when you grow old you will have to have braces
>
> P3: I also listen to what my dentist says because if you don't listen to them, when you grow bigger you could have some teeth sticking out of your mouth

A dentist's role is naturally associated with their knowledge about oral health. When children get direct instructions from the dentist about how to take care of their teeth and learn about the negative consequences of not following their advice, they are more likely to remember and implement change in behaviour than if the same is imparted by their parents. Children see the expertise in dentists and recognise the serious implications of inadequate oral health care. Thus, scare tactics used by dentists could be effective in bringing behavioural change.

Another potential barrier to reducing sugary diet could be their lack of awareness of the hidden sugar in some food and drinks like fizzy drinks, fruit juices and 'sugar free' cereals. It was found that many participants noticed sugar displays in the waiting room and spoke about it in the interview:

> When I was at the dentist in the waiting room I saw a board and it had bottles stuck to it and it said how much sugar it had in the drink and how much grams (Year 4 participant)

Such unique displays could grab children's attention and be useful in bringing awareness about sugar content in different food and drinks. One of the participants noticed such a display of healthy and unhealthy food in the dentist's chamber while having a check-up:

> P: When the dentist was checking my teeth, I saw this poster and it had plates and then it had food in like dairy milk and stuff like that. And it had plates where it said healthy diet or something.

I: What do you think it was trying to tell you?

P: I think it was there for the things you should eat and the things you don't (Year 4 participant).

Attractive displays could be set in different parts of the clinic that inform both children and parents about sugary food as well as brushing essentials. In another focus group interview, participants talked about similar displays:

P1: In the dentist, they show fizzy drinks and shows how much sugar it has and it has loads of sugar

P2: At the dentist I saw some drinks on the wall, different kind of drinks like energy drinks and Glucose and it had some cubes. One of the drinks had five and one of the drinks had two...

I: Do you remember what they were?

P2: I can't remember

It can be seen that although the participant remembered seeing the display, he did not retain all the information about the various drinks and their sugar content. It is essential that patients take home the information so that they remain sensitive about their regular sugar diet. Apart from having displays, it could be useful to provide leaflets that are snapshots of the display placed right next to it. In this way, patients can refer back to the information they gathered from the pictures and models exhibited in the clinic.

There were others who talked about sugar app which could be another useful way of knowing the sugar content in different food and drinks:

I: Did they use any leaflets or show anything on the phone?

P1: At the dentist I saw a chart. It had drinks on it and it had a bag and in the bag there is how much sugar there is in that drink [...] it was clever

P2: I saw a board and under it said what grams of sugar for drinks. On water it said 0 and the others it said 10 or 20.

P3: It had like this app and the scan viewed food and it showed the ones that I shouldn't eat and the ones that I should and showed how much sugar it has...

Different resources like sugar displays and sugar apps could be used to make children sensitive of the amount of sugar they take from certain food and drinks. Given that most were

aware of the negative effects of taking too much sugar, the information about the sugar content in different products could help children regulate their diet accordingly.

Theme 3: Motivation for change

Apart from the visit to the dentist and the general advice given, there are factors that could perpetuate change in behaviour. In this theme, we discuss two main sources of motivation that could have a considerable impact in their oral health care behaviour: (i) Scare tactics, and (ii) attractive products. We have already discussed briefly about scare tactics. In this theme, we discuss this in elaboration understanding how children's behaviour could be directly impacted by the knowledge of the negative consequences of neglecting oral health care.

Many participants from all the Year groups discussed about the problems that one could face if they did not take care of their teeth. Thus, negative reinforcements used by dentists and/or parents could potentially change the way they perceive oral health:

> I: Does your mum or dad check?
>
> P: No, I do it myself because if you don't brush your teeth, it will go all black and it will go bad. So I brush my teeth because I don't want them to go bad. (Year 5 participant)

The above response was obtained when the interviewer was enquiring about supervised brushing. There is a sense of responsibility that the participant showed to make sure that his teeth do not damage. Thus, understanding the negative consequences of not brushing and taking it seriously as his/her personal responsibility could potentially motivate a child to engage in better oral health care.

The following extract gives another interesting way of perceiving negative consequences that could affect their behaviour:

> I: What do you remember about brushing?
>
> P: The dentist said I should start brushing my teeth a little bit more and stop eating junk food [...] So now it's better
>
> I: So what made you change?

> P: If I kept on eating junk food and my teeth kept on falling out, you will have no teeth by the age of 40. People at the age of 90, they don't have any teeth. But if I don't have teeth at the age of 40, it will be weird (Year 5 participant)

Unlike commonly believed or assumed, children may forecast future problems and change their current behaviour to avoid negative consequences in the future. In the above extract, the participant looked far ahead in the future and the fear of losing his teeth at the age of 40, seemed to have made him conscious of his oral health in the present. Such fear tactics could be effectively used by both parents and dental care professionals to bring effective behavioural change.

There were many such responses obtained from the focus group interviews (shown in Box 1) that suggest that scare tactics could be used in increasing consciousness about their oral health and motivate them to do the essentials of brushing and avoiding sugary food.

Availability of products that are attractive for the children was seen to be another motivating factor in engaging in good oral health care. For instance, the sugar app that scanned food and drink products and informed about the sugar content could potentially affect their diet by making them conscious of the sugar intake in their diet:

It had like this app and the scan viewed food and it showed the ones that I shouldn't eat and the ones that I should and showed how much sugar it has and it said the more amount of sugar in it, the more it tastes chocolaty.

Apps with such interesting features could capture the attention of a child and its use could increase their awareness and at the same time make them choose food and drink products wisely. Similarly different dental care products could potentially capture children's interest in brushing:

I: What do you remember about going to the dentist the last time?

P: I went to the dentist a few weeks ago and they said that I've got quite a few holes in my teeth because I have been eating too much sweets and the dentist recommended me an Oral B toothbrush.

I: Really? Which one?

P: The one you put on charger

Box 1: Extracts from the interview highlighting motivation to change as a result of scare tactics

If you have too much sugar, you will get cavities. It will turn yellow. (Year 3 participant)

I watched this video in Google... this man he never used to brush his teeth. So one day he went to the dentist and they had to take some of his teeth out. So once his tooth was back and he started brushing them and then it became good. (Year 3 participant)

So I Googled. I saw what bacteria looks like and it is really disgusting. (Year 3 participant)

My mum said that if you don't brush your teeth all day and you don't use mouthwash, your breath will stink and you'll have so many trouble with your teeth and they may fall out and you'll have no tooth. (Year 3 participant)

If your adult tooth falls out, you'll have to get fake tooth

If you don't brush your teeth, you will have bad breath and black teeth and they will fall out (Year 3 participants)

If you've been drinking fizzy stuff, you can have cavities and of you're still eating, teh cavity will rot and you'll have a hole in it (Year 4 participant)

Sometimes when you eat too much sweets, it can like damage your teeth and you need to go to the dentist. Sometimes sweets can have a lot of sugar and juices like orange juice and Coca-cola have so much sugar in it that it can damage your teeth (Year 5 participant)

I: What's special about that toothbrush?

P: Like you press the button at the bottom and it starts... this [indicating the head of the model toothbrush] part of the brush starts moving and you put it in your mouth

I: Okay. And does it have a character on it?

P: Yes, Darth Vader from Star Wars. My brother's got one and his is Stormtrooper (Year 4 participant)

Both the functionality and the characters in the product were attractive to the child. Such products could potentially increase brushing habits and make them attend to their oral health. In the next theme, we discuss further about product preferences of the participants and how they perceived the features in the products, some of which captured their attention and possibly made them engage in better oral health care.

Theme 4: Product preferences

Participants were shown different dental care products such as toothbrushes (electric and manual), toothpastes and sticker charts and asked for their opinions about them. Interesting responses were obtained from the children who shared their preferences among the displayed products, most commenting on the electric toothbrushes.

When all the products were laid out on the table at the same time, participants mostly started with the electric toothbrushes, sharing their views and preferences, suggesting that they paid most attention to this product over the others. This could be for various reasons like attractive packaging, colour, functionality and other elements that captured their attention. Some of the responses from the participants were enlightening as they informed what they were looking for in the products, especially when they chose it themselves:

I: Who chooses the toothbrush for you and what do you prefer?

P1: I choose my toothbrush. I normally choose the one that is electric [...] I would choose that one [pointing to a product displayed] because it is FROZEN

P2: I normally choose

P3: I like the FROZEN one because I like the toothpaste and the brush

P4: I like this one because when it runs out, you can charge it (Year 3 participants)

The first participant seemed to pay attention to the functionality of the product first and then commented on the characters in it, while the third participant first expressed preference for

the characters in the product and then their functions. Either way it suggests that electric toothbrushes could be made more appealing when characters are added to it. This was found to be especially true for the Year 3 and Year 4 participants. Not many from the Year 5 focus groups commented about the characters in the products. Nonetheless they showed preference for the electric toothbrush:

> I: Why do you prefer the electric toothbrush?
>
> P1: It's easier
>
> P2: Less energy needed
>
> P3: It cleans your teeth better [...] and the round ones are better (Year 5 participants)

None in this group commented about the characters in the products, most only paid attention to the shape and size of the head of the toothbrush and the ease it provides in the process of brushing. When shown the products to another Year 5 focus group, one said:

> If I was younger and I liked CARS and things, I would brush with that. It might make me like it more because it has CARS.

Among the many toothbrushes (both electric and manual), the participant just commented on the electric toothbrush suggesting that there was a general preference for electric toothbrush, but the characters in it were not anymore appealing to him. Most Year 5 participants paid attention to the electric toothbrushes as they were perceived to be more useful and convenient than the manual one.

A group of Year 4 participants similarly shared their preference for electric toothbrushes whilst focusing on its functionality. When asked for their opinions about electric toothbrushes, they said:

> P1: If you have those round... and electric toothbrushes, then it's easier like to do each tooth
>
> P2: I have the electric toothbrush now and it's easier to brush your teeth because all you have to do is just hold to your teeth and just do that [shows by holding the model brush] and it rubs it for you. You don't have to rub it around in circles. You don't have to do it because the brush does it for you. (Year 4 participants)

These participants were not shown the products when this question was asked. Thus, it cannot be conclusively said that characters and colours in the products did not appeal to these

participants. However, it is clear from the above extract that they paid considerable attention to the ease and convenience of its use. Moreover, most were possibly informed of how they are supposed to brush, such as movements around their teeth and reaching out to all corners in their mouth. The awareness of the correct way to brush was facilitated by the toothbrushes. For instance, a small head meant that they could easily reach and brush all around their mouth. Additionally, an electric toothbrush automatically brushes in circles and hence did not require them to remember doing this manually whilst brushing. One of the participants from Year 4 even commented saying, 'The electric ones are much better because it feels clean'. Most participants expressed positive views about the electric toothbrushes even before the products were shown to them.

There were many participants from Year 4 who showed preference for products also based on characters in them. After asking a group of Year 4 participants whether they had an electric or a manual toothbrush, three responded saying electric, to which the interviewer asked,

> I: Tell me about your electric toothbrush. What have you got?
>
> P1: Mine is the Spiderman one
>
> P2: That's the one I used to have
>
> I: Why did you choose the Spiderman one?
>
> P1: I don't know
>
> I: What about you? [asking the third participant about his electric toothbrush]
>
> P3: What happened is I wanted something so my mum went to [names a grocery store]. I didn't have a toothbrush because it fell in the toilet. And my mum went to [names the grocery store again] and she got me an electric toothbrush. It was a Darth Vader one that could light up and then you can press the button and it will do it itself (Year 4 participants)

The automatic function of the electric toothbrush was appealing to most participants and when there were added features with characters in them, it raised their enthusiasm for the product. After seeing the excitement of one of the participants for a Star Wars toothbrush, the interviewer asked, 'If you had a Star Wars toothbrush, do you think it will help you brush more?' To this the participant replied in excitement,

> I will do it every single day even if it made me miss school to start brushing my teeth (Year 4 participant)

In another focus group with Year 4 participants, when the interviewer asked, ‘Would the pictures in the toothbrush help?’, the participants replied:

P1: It doesn’t matter

P2: I would brush more

P3: Yeah because I like CARS

Although not all participants were attracted to the characters in the products, most claimed that they would brush more if the toothbrushes had their favourite characters in them. Thus, availability of attractive toothbrushes could potentially increase the likelihood of performing their daily brushing routine.

Box 2. Opinions shared about electric toothbrushes displayed on the table

I like this one because it is electric (Year 3 participant)

I like this because it is red (Year 3 participant)

I like this because it is electric and I have seen on television the best ones are round (Year 3 participant)

I like it because I have seen TV adverts where they are round brush (Year 3 participant)

Electric toothbrushes are really good because you don’t have to move it around (Year 3 participant)

I choose FROZEN because it is FROZEN (Year 4 participant)

Furthermore, most of the responses and opinions of the participants suggest that they paid attention to the electric toothbrushes more than the other products because it had appeal both in terms of how it looks and the function it performs (Box 2 explicates some of the other responses on electric toothbrushes).

Such strong opinions for products were only seen to be associated with the electric toothbrushes. Even the characters in the manual toothbrushes did not receive as much attention.

The other products (toothpastes and sticker charts) only received passing references. For instance, when the interviewer asked about their views on the toothpastes displayed on the table, they said:

P1: I like the multicoloured toothpastes

P2: Bubblegum flavour

P3: My toothpaste is rich in mint so my mum got a mouthwash that is berry flavour (Year 4 participants)

The participants commented on toothpastes with much less excitement and enthusiasm compared to the toothbrushes. One of the participants said that she chose a specific toothpaste because it matched with her toothbrush. Most only concentrated on the flavour rather than the packaging (‘I like this because it tastes nice’, Year 3 participant). When one of the participants from Year 3 was asked about the toothpastes, he commented, ‘It’s just a cover’. This indicates that because toothpastes were perceived as temporary possession, a product that would soon run out and will have to be thrown, participants did not focus much on the packaging of the toothpastes.

Furthermore, not many commented on the sticker charts. There were only a few who said they remembered using something like that when they were younger.

Conclusions

This is the first study to explore the experiences of children regarding the oral health advice received from dental practitioners and their wider team, and how this advice influences their oral health behaviours. Children expressed a desire for advice to be dispensed in a friendly rather than authoritative way, and suggested that they would be more likely to follow the advice if the dental setting was an attractive environment with stimulation such as posters and television. With regards to the actual messages, children seemed to be generally aware of oral health messages, many which are supported by the delivering better oral healthcare toolkit. Although not all the recalled advice was supported by the Public Health England prevention toolkit, it suggests that generally, oral health messages are being delivered and remembered.

Children were overwhelmingly pre-occupied with the use of technology to support their oral health care behaviours and provide oral health education, demonstrated by their pre-occupation with electric toothbrushes and the use of technology (e.g., phone apps, games, videos). The use of characters on products appealed mainly to younger children, and mainly appealed when used on electric toothbrushes, as these are not seen as disposable like manual toothbrushes and toothpaste.

Thus, from a child's point of view, oral health advice delivered in a friendly and supportive way in an attractive and stimulating environment may be most welcome. Additionally, using technology to support the advice given, such as the promotion of electric toothbrushes and suggestion of phone apps and videos may also increase the effect of the advice on subsequent health behaviour. This technology can be aimed at reducing barriers such as forgetting (a problem especially at night) through reminders and increasing facilitators such as motivation by providing further education on the negative consequences of not caring for oral health.

Although exploring the experiences of receiving oral health advice from children themselves, these finding constitute personal experiences of the children, which may or may not be exaggerated. Therefore, some caution must be taken when interpreting the findings and when using the findings to inform the development of future interventions.

Exploring the experiences of delivering oral health advice from the dental health professionals point of view, and exploring experiences of parents when being delivered oral health advice for their children will help us to further understand how oral health advice

could most effectively be delivered within an oral health setting, in order to develop appropriate materials to support the advice delivered within the dental setting.

A combined paper of focus groups with dental teams, parents, and children within this project is in preparation for publication.

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