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Parental views on delivering preventive advice to children referred for treatment of dental caries under general anaesthesia: A qualitative investigation

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Objectives: To: 1, Explore opinions of parents of children undergoing caries treatment under general anaesthesia (GA) regarding delivery of oral health advice; 2, Discover current oral health practices and beliefs; 3, Inform further research and action. ***Methods:*** Qualitative study using semi-structured interviews and thematic data analysis, sampling parents of children aged 3-10 years undergoing GA tooth extraction due to dental caries. ***Results:*** Twenty nine parents were interviewed (mean age 38.9 years, range 28-50, sd 6.4). The mean age of their children was seven years (range 3-10, sd 2.1). All children required deciduous tooth extractions (5.1 teeth on average). Those that also required permanent tooth extractions had on average 2.1 permanent teeth extracted. Many parents knew the importance of oral hygiene and sugar limitation, describing it as 'general knowledge' and 'common sense'. However, few understood that fruit juice is potentially cariogenic. Parenting challenges seemed to restrict their ability to control the child's diet and establish oral hygiene. Many reported not previously receiving oral health advice and reported never having fluoride varnish applied. There were requests for more caries prevention information and advice via the internet, schools or video games. ***Conclusion:*** Parental oral health knowledge, parenting skills, and previous advice received seem to all be issues related to the oral health of those children. Providing advice, especially in respect to fruit juice cariogenicity and the benefits of fluoride application through a child-friendly website, including a video game, as well as the use of school programmes might be an acceptable approach.

Key words: *early childhood caries, prevention, parental views, qualitative research, diet, sugar, fruit juice*

Introduction

The results of the most recent oral health survey of five-year-old children in England have shown that around 28% of them suffer from dental caries (Davies *et al.,* 2013). Caries in young children is a world-wide problem. Davies *et al*. (2001) reported that 32% of 3-year-olds in Manchester experienced caries; 19% of whom had caries affecting their upper incisors, indicating a more severe form of the disease. In the US, 41% of children aged 2-11 years suffered from caries in their primary teeth, with no change in the prevalence of the disease in this group from 1988 to 1994, and from 1999 to 2002 (Beltrán-Aguilar *et al*., 2005). In Australia, the 2002 Child Dental Health Survey reported that 46% of 6-year-olds had one or more decayed or missing teeth, and 10% of were found to have ten or more decayed teeth (Mejia *et al*., 2007). The prevalence of Early Childhood Caries (defined by Ismail (1998) as the occurrence of any sign of dental caries on any tooth surface during the first 3 years of life) in developing countries or socially deprived populations within developed countries is even higher, with reports suggesting up to 70% of children can be affected (Milnes, 1996).

A significant proportion of these children end up receiving treatment under general anaesthesia (GA), due to extensive multi-quadrant caries and/or the child's anxiety (Davies *et al*., 2008). In the UK, Approximately 5% of five-year-olds, and 11% of eight-year-olds, have had dental treatment under GA at least once in their life (Morris *et al*., 2006). These children are usually at high caries risk, reflected in the large number of teeth requiring extraction in every treatment session. A study in 2004 showed that on average, 7.4 teeth were extracted and almost 90% of the children treated were in the poorest socio-economic groups (Hosey *et al*., 2006).

Previous studies have shown that only a minority of those children ever attend their recall appointments following their GA. A study in the US reported that 69% failed to attend follow up visits (Primosch *et al*., 2001). In the UK, the fraction is similar (Hosey *et al*., 2009). Poor follow up, combined with high caries risk, leads to repeat treatment being required. A study in Glasgow found that 25% of children having caries treatment under GA were returning after earlier such treatment (Hosey *et al*., 2006). A more recent London study reported similar results, with 23% of these children being returnees and 47% coming from families with at least one child having had a similar procedure despite a thorough specialist pre-op assessment and rigorous treatment (Olley *et al*., 2011).

The findings of Olley *et al*. (2011) suggest these patients come from high risk families, and that failure in post-operative prevention, not inadequate assessment, causes these high repeat rates. Indeed, the aforementioned study reported that 61% of the parents had no plans for continuing dental care for their child. Despite this,

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71% of parents requested support for their child's oral health. Clearly, there is need for a preventive intervention tailored to this category of high caries risk children to improve their oral health and decrease the need for further treatment.

This study explored the opinions of parents of children undergoing dental caries treatment under general anaesthesia, regarding the delivery of advice on caries prevention. A second aim was to explore their current oral health knowledge and practices, as well as previous advice they have received. This information could help shape future research action.

Methods

A qualitative design was used. Face to face semi-structured interviews were conducted using an interview schedule to ensure that key areas of interest were covered but also allowing the subjects space to express their feelings in their own words. All interviews were audio recorded and then transcribed verbatim by an external transcription agency. Transcriptions were kept anonymised and only participants' age and gender were noted. The study was approved by West London Research Ethics Committee (Reference Number 11/Lo/1249) and was conducted in King's College Hospital, London.

Potential participants were alerted to the study during their children's dental consultation visit at the paediatric dentistry department. They were then approached by the researcher during their child's medical pre-assessment appointment prior to the GA visit. These clinics are held once a week. The researcher attended the morning sessions and approached all eligible parents. Written consent was obtained from those who agreed to participate. The sample size was determined to be sufficient once thematic saturation was reached, i.e. new interviews generated no new themes (Crabtree and Miller, 1999).

Twenty nine participants took part. They were parents of children (aged 3-10 years) who had been referred for extraction of carious teeth under GA. Potential participants were excluded if they didn't speak English, the child had underlying health problems, or the child had learning difficulties.

The Gunning fog index (1969) was used to ensure the information sheet and interview questions were designed using accessible language. A short interview schedule was developed and divided into five main sections:

- Basic information: age, relationship to child, and employment status
- History of caries treatment under GA in the family
- Current prevention practices: child's tooth brushing, diet, fluoride therapy and dental attendance
- Previous oral health advice
- Opinion on suggested oral health advice delivery methods.

The interviews were analysed using thematic data analysis. This is a common approach to qualitative data analysis which requires examining the data to identify relevant themes through a series of systematic steps (Ritchie and Lewis, 2003). The process involved the researcher (AKA) first familiarising himself with the data through reading the transcripts, followed by a more detailed reading to assign primary codes to the data. As more data were collected, These primary codes were being constantly reviewed and modified, combined or truncated to create appropriate themes. During data analysis, that researcher would regularly meet with a second researcher (MTH) to read through transcripts and discuss coding and emerging themes to encourage inter-rater agreement.

Results

Forty three parents were approached over an eight week period, 30 of whom agreed to take part. One withdrew consent due to time constraints; hence, 29 were interviewed. Approximately six hours of audio tape were available for analysis.

The parents (mean age 38 years, range 28-50, sd 6.4) consisted of 21 mothers and 8 fathers of various ethnicities: 41% Afro-Caribbean, 24% white British, 17% Asian, 7% other ethnic backgrounds. Manual workers accounted for 28% of participants, 28% were skilled workers, 7% self-employed, 24% unemployed, and the status for 14% was unknown. Most participants, 83%, lived in inner London areas.

The children were 17 boys and 12 girls (mean age 7 years, range 3-10, sd 2.1). All children required extraction of primary teeth, on average 5.1 primary teeth (range 1-11). Permanent teeth were to be extracted from 7 children with a mean of 2.1 teeth per child (range 1-4). None of the children had previously had dental treatment under GA, and only 14% of the parents said they previously had another child receive such treatment.

Analysing the qualitative data available, three main themes emerged from the interviews: oral health knowledge, practices, and challenges; oral health support received; and, preferences for delivery of oral health support.

Oral health knowledge, practices, and challenges

Parents generally said their children brush twice daily, though some reported only daily brushing, very few less often. Many of those with children under 7 claimed to supervise toothbrushing. These findings suggest parents understood the importance of oral hygiene.

Parents described the difficulties they face in maintaining a toothbrushing regime at home, demonstrating inability to take control. They blamed time constraints, the number of children, children's attitude and brushing skills:

'He doesn't clean his teeth properly, when I say to him, look Ellis [child] let me do it, he'll get all upset… so when you're rushing out of the house it's really difficult' M26, aged 46

Almost half perceived their children's diets to be healthy. In their view a healthy diet was described as rich in fruits and vegetables and low in sweets:

'*My daughter eats I would say healthy. She does not really like chocolate, sweets and stuff. She likes her fruits and, maybe crisps. Fruits she snacks on a lot'* M11, aged 28

However, there was a clear weakness in understanding the cariogenicity of certain items such as fruit juices:

'I did not have any idea that pure fruit juice rots the teeth'. M1, aged 28

'I'm not aware that the juice is sweet'. F2, aged 48

In many cases, parents reported difficulties in con-

trolling their children's diets, again blaming the child's attitude, other family members, or their need to please their children through buying sweets:

'Can somebody stop you from eating sweets?! No! I am a mom [mother] so you just want to please him sometimes.' M16, aged 38

'If he's got to go with his dad, sometimes they tend to walk down to the store and get candies [sweets]'. M8, aged 44

Oral health support received

Many participants reported never receiving oral health advice. In many cases advice was late and reactionary to the disease, one mother noted:

'It was too late; it was afterwards, it was a cure not the prevention that could have been given.' M24, aged 38

Those who did receive advice noted it revolved around two components: sugar intake (sweets only), and tooth brushing. Parents described the advice as 'general knowledge' and 'common sense':

'I think I know everything… You know they need to brush their teeth and what they need to eat; it's not the knowledge, it's the implementation.' M19, aged 26

'I knew most of it already anyway so I think it was just reinforcing some of the things that I already knew'. M13, aged 44

Only a few parents thought that their child had fluoride varnish applied, while many reported not knowing about fluoride varnish or having it applied before.

Preferences for delivery of oral health support

Most participants had an internet connection. They stated that using the internet can be popular with children; however, there is a need for promotion and centralisation of advice to ensure it is accessible and consistent:

'*Nowadays the information available is not reliable as well, you understand? There is so much information there; I don't know which one to take.'* F28, aged 43

'A website where the children can sort of access it and know all about teeth as well, and how to take care of them, and they can interact as well, that'd be very good, because they love to explore into things don't they.' M26, aged 46

Another option, which can also be provided over the internet, is the use of video games, which might be a potential way to deliver advice to the children:

'She would absolutely love it because she does them sort of games at the moment. So give her something with teeth on there, she would be very interested I know that'. M4, aged 30

'I think that would be good for them because kids nowadays in this day and age like games, so I think that'll be good for them'. M14, aged 28

Parents wanted more preventive efforts in schools. They thought the delivery of advice to children directly through schools might be beneficial, since children might respond better to a figure of authority other than parents, reflecting what might be considered as their need for parental support:

'They just think oh it's a nagging old mum, if they were actually getting taught it and shown it in school, I think they would take it more seriously, even when they're young'. M24, aged 38

They also noted that children might be more motivated when surrounded by their peers:

'Instead of having one child by one, you have a group of children, it saves time for the doctor and everyone else, and the children get more interested, because they're all together there, so they will listen and they will discuss it together'. F25, aged 43

Other options discussed didn't prove as popular, telephone helplines were deemed difficult to access due to time constraints:

'You know I'm a busy mummy, I don't think I've got time to be honest with you, but internet, I would love to go internet and check'. M21, aged 37

Discussion

The sample compares well with previous studies in a similar cohort. (Karki *et al*., 2011; Olley *et al*., 2011); however, none of the participating children had previously required dental GA, and only 14% of parents reported a history of GA use in another sibling. These numbers are low when compared with previous investigations (Albadri *et al*., 2006; Harrison and Nutting, 2000; Kakaounaki *et al*., 2011; Macpherson *et al*., 2005), or with a previous King's College Hospital study, which found that 47% of the children presenting had a history of GA themselves or one or more of their siblings (Olley *et al*., 2011). This may be due to parents from higher risk families refusing to take part in this study.

Parental oral health knowledge, attitudes and behaviours could have a detrimental effect on a child's oral health; a recent review (Hooley *et al*., 2012) has shown that children of parents with a poor attitude towards oral hygiene, healthy diet or dental care are at a higher risk of dental caries.

In the current study, parents seemed to understand the role of sugar in dental caries and the importance of oral hygiene, however, they seemed to be unaware of the potential cariogenicity, of frequent fruit juice intake, perhaps due to its constant association with what the public considers *'healthy'*. The potential cariogenicity of fruit juice has been discussed in a review by Tahmassebi *et al.* in 2006. Earlier work suggests that natural sugars occurring in fruit juice might be cariogenic (Duggal and Curzon 1989; Frostell 1973). A more recent American study that included around 650 children has shown that high fruit juice intake might increase caries risk, although that was to a lesser extent than non-natural soft drinks (Marshall *et al*., 2003). Further research to investigate the effect of frequent fruit juice intake in children is needed.

Parents described the difficulties they face in applying this knowledge to their children, blaming the child, other family members, the child's peers, or the media for the child's sweet consumption. Understanding the damage sugar intake can cause to the child's oral health and yet not being able to restrict it might suggest parenting issues in these families. In a cross-sectional study, Peters *et al*. (2012) demonstrated how a child's intake of sugary foods was closely related to parenting style, not parents' knowledge.

When it comes to establishing a toothbrushing regimen, parenting issues can again be noted. Parents described time constraints and the child's attitude as bar-

riers to regular supervised toothbrushing. These findings were also reported in previous studies such as Vermaire *et al*. (2010). Indeed, Olley *et al*. (2011) reported that parents complained that their children refused to brush their teeth and that time constraints prevented them from supervising children's tooth brushing.

Advice delivered by dentists seems to be insufficient and usually too late. Parents who have received advice described it as *'general knowledge'* that involved only stopping sugar and brushing teeth regularly. These findings confirm the results of an earlier study that reported that dentists provide advice mainly on restricting sugary food and tooth brushing (Threlfall *et al*., 2007).

Only a few parents reported earlier fluoride varnish application for their children. These results do not come as a surprise; a previous retrospective study reported that only 1% of children attending dental care at general dental practices received fluoride varnish application (Tickle *et al*., 2003). In 2011, only 8% of procedures performed at general dental practices included fluoride varnish application (NHS Information Centre, 2011). Clearly there is a need to educate parents on the efficacy of fluoride varnish in preventing dental caries, as well as educate general dental practitioners to ensure that the Department of Health guidelines on prevention of dental caries are being implemented (Department of Health, 2009).

The majority of parents indicated they would like to receive support to prevent dental caries in their children. Using modalities such as the internet, video games or schools to deliver advice seemed to be highly acceptable. Others such as telephone helplines or home visits were less acceptable. At the moment, numerous websites are available with oral health care advice, yet only one participant indicated that he checked the internet before for information. Hence, parents might have asked for advice only to give a desirable answer, or their current lack of use might be explained by real limitations in the information currently available. Some parents indicated that there is a lack of trust in the advice available over the internet and that the presence of numerous websites with different advice can cause confusion, they suggested centralised NHS advice, with a child friendly interface to provide advice that is well promoted and consistent. Such a website would require promotion through various contact points with these families, and the next edition of 'Delivering Better Oral Health' (Department of Health, 2009) could be used as the basis for the advice provided.

The use of video games to promote oral health is underresearched. However, health education research shows that such games may increase knowledge and subsequently change behaviour (Primack *et al*., 2012). Parents believed their children might more readily follow oral health advice if they were more involved, and suggested video games as a suitable modality. Further research is needed to determine if such interventions can help improve the oral health knowledge and behaviours of these families.

This study has its limitations; parents who refused to take part might hold different opinions, and those who took part might have provided what they thought will be desirable answers. In addition, the study took place after the participants' children were referred to a specialised hospital, which might have influenced their oral health knowledge and beliefs.

Conclusion

The findings suggest that dental caries in these families may be associated with knowledge and parenting skills. Advice, especially in areas of fruit juice cariogenicity and the benefits of fluoride application is needed, while parenting support might also be of benefit. Delivery of oral health advice through a child friendly internet website, including a video game, or through a school programme might be beneficial and should be explored and evaluated.

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