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Title

Assessing the feasibility of a supervised toothbrushing program within breakfast clubs in Victorian Primary Schools.

Abstract

Objective: To determine the feasibility and acceptability of implementing a supervised toothbrushing program within established breakfast clubs in three Victorian primary schools.

Design/Methods: The pilot program was run in one metropolitan and two rural school breakfast clubs. Feasibility was measured by uptake and acceptability of the program (with school principals, breakfast club coordinators, volunteers, children and parents); whether children continued to brush their teeth throughout the program and whether children brushed for long enough to be considered effective. The evaluation had two data collection approaches; observations during the toothbrushing program within the school breakfast program, and interviews with coordinators of the breakfast club program, school staff and volunteers who assisted with the program.

Results: One hundred and six children were recruited from three primary schools, with 58 children from a metropolitan school and 21 and 27 children from two rural schools. The programs operated for five to seven weeks. Two program models were assessed; the wet program (using sinks) had an average participation rate of 32 per cent, compared to 82 and 91 per cent for the dry program (classroom based). Children consistently brushed for a longer period i.e. two minutes in the dry program. Children appeared to enjoy the social aspects of the programs; however the design of the dry program provided the opportunity for more child 'play' and interaction. Breakfast club

coordinators, school staff and volunteers felt that staffing, either voluntary or paid, within the program was crucial for continued success.

Conclusions: The dry toothbrushing program was found to be the more suitable approach as children participated more often and brushed for longer periods compared to the wet program. The integration of the supervised toothbrushing program into the breakfast program in the schools was deemed feasible if the program was adequately staffed.

Key words: toothbrushing, schools, dental caries, health promotion, oral health

Introduction

A healthy mouth enables children to eat, speak, and socialise without pain, discomfort or embarrassment (Kassebaum et al., 2015; Sheiham, 2005). Dental caries (tooth decay) is the most common oral disease facing children in Australia (Do & Spencer, 2016) with the recent 2012-2014 National Child Oral Health Survey (NCOHS) showing only small improvements in dental caries experience in primary teeth since the 1987-1988 National Oral Health Survey (Do et al., 2016). The latest National Child Oral Health Survey demonstrated that 42 per cent of the children aged five to ten years had dental caries experience in their primary teeth (Ha, Roberts-Thomson, Arrow, Peres, & Do, 2016). There are many determinants for poor oral health including socio-economic disadvantage, age, gender, environment and lifestyle (Watt & Sheiham, 2012). Dental caries is largely preventable (Do & Spencer, 2016). In addition to minimising the consumption of sugary foods (Chi et al., 2015), twice daily toothbrushing using fluoride toothpaste (Gibson & Williams, 1999) from an early age has been shown to be an important preventive measure (Marinho, 2014).

Breakfast clubs that operate throughout Australia are often supported by organisations such as the Australian Red Cross, and target children who are most at risk of starting the school day hungry or without adequate nutrition. It is known that children from less privileged backgrounds, many of whom utilise such programs, are less likely to engage in adequate toothbrushing behaviours (Hamasha, Warren, Levy, Broffitt, & Kanellis, 2006; Kilpatrick, Neumann, Lucas, Chapman, & Nicholson, 2012). Whilst Aunger (2007) argued changing toothbrushing routines might be best approached at the family level, as the practice is likely to follow family habits that are led by parents rather than children, he also acknowledged that targeting the children themselves might be a

suitable approach. The rationale behind this study was to introduce the toothbrushing behaviour into an established breakfast routine, thereby mimicking what might be a normal established routine for some children at home. Further to this, children would also gain the experience and memory of brushing for a prescribed time.

Supervised toothbrushing programs in schools have been shown to improve child oral health (Damle, Patil, Jain, Damle, & Chopal, 2014; Jackson et al., 2005; Macpherson, Anopa, Conway, & McMahon, 2013; Woodall, Woodward, Witty, & McCulloch, 2014). However, a recent Cochrane review suggests there is uncertainty about the effectiveness of primary school-based toothbrushing interventions on caries reduction (Cooper, Coffey, & Dugdill, 2014). Whilst there has been an international focus on incorporating supervised toothbrushing within childcare and school settings there is limited evidence to suggest the model is feasible when applied in the Australian school context.

The literature has identified a number of barriers that exist for toothbrushing programs such as demands on school staff (Al-Jundi, Hammad, & Alwaeli, 2006; Gray-Burrows et al., 2016), teachers believing toothbrushing is the parent's responsibility (Gowda & Croucher, 2011) and the cost of resources and staff (Al-Jundi et al., 2006). One New Zealand study reported that when teachers were provided with support and resources, these obstacles could be managed (Gowda & Croucher, 2011). Studies have also shown that parental difficulties with child behaviours around toothbrushing are a major barrier for toothbrushing at home (Marshman et al., 2016).

This pilot study aimed to determine the feasibility of incorporating a supervised toothbrushing program within existing Australian Red Cross facilitated breakfast clubs in three Victorian primary schools.

Methods

Development of supervised toothbrushing in school breakfast club toolkit

Toolkits were developed to support the delivery of the toothbrushing programs in the school breakfast clubs. These toolkits provided information about the toothbrushing program procedures and infection control guidelines and were designed to be simple to use. The original toolkit was developed for a wet toothbrushing program using evidence from the literature and was guided by the Supervised Tooth Brushing Program in Victorian Primary Schools Study Advisory Group. The Advisory Group included representatives from the Victorian Department of Health and Human Services, Dental Health Services Victoria, University of Melbourne, La Trobe University and the Australian Red Cross. The wet program used the traditional way of toothbrushing at a sink. Children collected their toothbrush kit and timers and brushed their teeth at a sink. Utilising research from other programs such as the Rural ECOH-Engaging Communities in Oral Health project (Rural ECOH-Engaging Communities in Oral Health, 2015) the wet program was reviewed and an alternative dry model was developed. The dry program was designed to have children brushing their teeth inside seated around a table. After brushing the children spat the excess toothpaste into a tissue, wiped their mouth and disposed of the rubbish. They then rinsed and dried their toothbrush at a designated sink inside and placed the toothbrush in the container provided. A brushing time of two minutes was considered long enough to be effective (Gallagher et al., 2009).

Recruitment: Schools, volunteers and children

Three Victorian primary schools, two rural and one metropolitan, with existing breakfast clubs run by the Australian Red Cross, were invited to take part in the study (Table 1). Being a feasibility study, the sampling method was convenience. After the schools had consented to participate, all students who attended the breakfast club were provided with a participation pack. Where parental consent was obtained, these children were provided with a toothbrush, toothpaste and a container that was clearly labelled with their name and the children could decorate the containers as desired. Volunteers were recruited by DHSV to assist with the standardised observational data collection and delivery of the program. Volunteers included one primary school teaching student, three Bachelor of Oral Health students, one dental assistant and one parent. Researchers explained, to the volunteers, how to complete the data collection form and were provided with information on what they should be observing. Information regarding the number of children attending the breakfast club, the number of children brushing and the length of time children were generally brushing were recorded using this template at breakfast club sessions at least once per week across the course of the program. Observations around the children's responses to the program and problems that were encountered were also documented, with safety concerns being noted and addressed immediately. Two minute timers were provided during each toothbrushing session for children to use if they wished. An estimate of their overall brushing time was recorded by the volunteer/DHSV researcher during toothbrushing sessions. Stickers were provided as rewards for participation in both programs. Participation rates were calculated as the proportion of children attending the breakfast

club who participated in the toothbrusing program. Children who attended the breakfast club to brush only were also included in the overall breakfast club attendance.

Key Informant Interviews

At the completion of the pilot study, thirteen staff, breakfast club coordinators and volunteers at all schools were asked to provide feedback on the program. Seven of these participated in four semi-structured 15-25 minute topic-guided interviews resulting in a 53.9% participation rate. The interviews were audio recorded and transcribed verbatim. The transcriptions were then coded and categorised to elicit the main themes from the data. Codes were based on recurring concepts or notable comments relating to the programs. Participant data were initially coded independently and then brought together to identify broader themes. Coding was undertaken by one researcher and the coding and categories were then discussed with another senior researcher until agreement was reached regarding the themes. The aim of the interviews was to evaluate the suitability and acceptability of the toothbrushing program and to identify barriers and enablers for the program.

Approvals

Ethics approval for the project was obtained from the University of Melbourne Human Research Ethics Committee (Application No. 1544044.1, 2015) and approval was also obtained from the Victorian Department of Education and Training (Application No. 2015_002752).

Results

A total of 106 parents gave consent for their child to take part in the supervised toothbrushing program across the three schools, with 58 children from the metropolitan

school and 21 and 27 children from the rural schools respectively (Table 1). The toothbrushing programs were run for five to seven weeks across the school term. The overall mean age of the children was 8.8 years (95% CI: 8.4-9.2).

<<Table 1>> entered here

Breakfast clubs operated within a school common area and were coordinated by breakfast club coordinators, volunteers and parents and were supported in small schools by teachers and the principal.

General observations

General observations noted throughout the programs are summarised in table 2. In particular, throughout the dry program it was observed that children enjoyed sitting together talking while they brushed. Competition with 'play' time was noted as a problem for the wet program (Table 2). Minor behaviour management issues for both programs were noted and addressed accordingly.

<<Table 2>> entered here

Participation rates and toothbrushing duration

Participation rates and toothbrushing duration within the wet program reduced considerably over time, whereas children participated more often and consistently brushed for two minutes in the dry program (Figures 1 and 2). The wet program had an average participation rate of 32 per cent, compared to 82 and 91 per cent for the dry program.

<<Figure 1>> entered here

<<Figure 2>>entered here

Enablers and Barriers

A number of barriers and enablers were identified through the participant interviews.

Barriers

Time limitations in breakfast clubs

Participants felt that breakfast clubs were very busy. Such factors as the weather, age of the children and staffing could impact on the time available for toothbrushing.

> *'When the weather is good they just want to play...sometimes they have to rush...time is difficult.' (wet)*

Volunteers and sustainability

Generally participants were very positive about the toothbrushing program and could see the benefit for the children; however, many felt that if they were going to run a program into the future, a volunteer would be necessary.

> *'If we are looking at doing this long term…..will need to get a person.' (dry)*

Participants varied in their beliefs about the feasibility of accessing volunteers for the program.

> *'Trying to get a parent has proved somewhat of a challenge…there are valid reasons why...' (dry)*

> *'You can work towards making it sustainable by getting the extra person…it has worked in the past with the brekkie program.' (dry)*

Concerns around teacher workloads

Participants reflected that there were many issues around staffing a toothbrushing program; highlighted issues included not sufficient time to run the program through to adding to the teacher's workload (for small schools where teachers/principals assisted with the program). It was perceived that it was the parents' job to brush children's teeth and that burdening teachers with another task was too much.

> *'In a very small school with adding toothbrushing to everything else that teachers already have to do... It was a great initiative. Unfortunately the staffing is the issue…brushing teeth couldn't be any further from teaching.' (dry)*

When asked '*how would you feel about the program if it was run by a volunteer?'* the participant was more confident that it could work and was very positive about the program's potential.

> *'Yes it was piece of cake* (talking about the dry program). *You are just getting children to brush their teeth it's not rocket science.' (dry)*

Cost of program

Cost was identified as a potential barrier to a school's ability to take on the program into the future. However, one participant indicated that staffing was a bigger issue than the cost of materials.

> *'Now these days the budget is very tight….' (wet)*

> *'The cost of the program wouldn't be that much, staffing is more of the issue.' (dry)*

Religious and cultural considerations

Participants who had experience with children from Muslim backgrounds provided an insight into potential issues around Ramadan and toothbrushing.

> *'Also Ramadan for one month…they can't brush their teeth. They can only eat when they go home, after sunset……even water….' (wet)*

Participants from metropolitan areas who had experience with new migrants in the school, felt that refugees may not be familiar with toothbrushing.

> *'Sometimes because some of them were in a refugee camp for a long time and never have a chance to do it* (referring to toothbrushing)*' (wet)*

Attitudes towards the dry program

A volunteer stated that the children had commented on the spitting in the dry program. This volunteer also reported feeling uncomfortable with the spitting.

> *'Personally I found it a bit off-putting…Some children had a lot of saliva and some don't.' (DHSV, volunteer)*

Enablers

Child group dynamics

Participants described the children as enjoying, and being engaged with, the program.

> *'The children have been very positive…they get that sense of ownership, this is my toothbrush and that brings something to the program' (dry)*

Participants said that children encouraged their peers to take part in the program based on their experiences.

'He's worried. He told his friend to join because he didn't want to end up like his grandmother, he said it was because she ate too much sugar.' (wet)

'There was a child that wasn't brushing at home, she would gag...but here (at school) *she was sitting up and brushing her teeth happily.' (dry)*

Younger children more likely to participate

It was perceived that the program may be more appealing to younger children. Participants reflected that the new activity becomes part of the child's routine over time. This could also be considered a barrier if wanting to engage older children.

'I think when you start a new program the older kids are always going to be a barrier and if they aren't receptive that can filter down a little bit…once the younger ones move up with a positive attitude the school culture changes.' (dry)

Opportunity for children from non-English speaking backgrounds to practice English

Breakfast clubs and toothbrushing programs could provide an opportunity for children from non-English speaking backgrounds to socialise and practise English in a relaxed environment.

'The breakfast club is a good way to learn, because they learn hello and good morning ..and a social life for the children as well.' (wet)

Discussion

This study demonstrated that school breakfast clubs can provide an opportunity to incorporate supervised toothbrushing within the Australian context. This study is important because both contextual and process evaluation of such programs is rare.

The dry program was considered the more successful and feasible program as children participated more often and consistently brushed for the required two minutes. Sitting together around a table provided children with the setting to engage, time each other's brushing and fully utilise the sticker incentives after brushing. This program was therefore able to compete with other playtime activities. A small study that used behaviour modification principles found that incorporating games into a school-based toothbrushing program resulted in improved child oral health outcomes with effects being present nine months later (Swain, Allard, & Holborn, 1982). Within the wet toothbrushing program, there were lower participation rates and reduced individual brushing times. We feel that in its current form, the wet program is less likely to be sustainable, however it should be noted that this program was only trialled at one school.

This study has identified a number of important barriers and enablers within Victorian primary schools. Barriers such as time limitations in breakfast clubs, issues around accessing and keeping volunteers, teacher workloads and cost were the main barriers identified and were consistent with previous research. Enablers identified in the Victorian Primary school settings included group dynamics that enabled children to encourage other children to support other children in brushing and breakfast club workers believing younger children would be more likely to take part.

The value of positive peer group pressure around toothbrushing at school was an important implication of this research. The example of the child who would not brush at home, but happily participated in brushing at school highlighted the potential for school programs to allay child concerns around toothbrushing. These findings were supported by other research where parents reported that toothbrushing at home had become easier after children had participated in school-based toothbrushing programs (Woodall et al., 2014). Considering that parental difficulties with managing children's behaviour around toothbrushing has been identified as a barrier to toothbrushing at home (Marshman et al., 2016), this research suggests that school toothbrushing programs may provide a relaxed setting for children to learn how to brush amongst their peers. Having experienced a toothbrushing program at school may motivate children to take this learned oral health practice from school back into the home environment.

Feedback from breakfast club coordinators and volunteers suggested that schools may find it challenging to access their own volunteers, however it should be noted that there were mixed feelings about this issue, with some participants being confident that they could access volunteers. As shown by this research and that of another study (Woodall et al., 2014) some teachers and principals might view toothbrushing programs as 'not their responsibility' and part of the feasibility of any program may be challenged if the burden was placed on teachers or volunteers who are already busy with other responsibilities. It should be noted that, within the Australian Red Cross breakfast club program, generally volunteers and parents run the program, however in small rural schools teachers and even the principal may support such programs. Principals, who ultimately provide the final decision on whether such programs go ahead, may be more likely to take up programs that have staffing considered within their design. As tested

in this study, the engagement with local community-based public dental services was achievable, and other research supports the need for dental agency staff to be considered within any toothbrushing program design (Gowda & Croucher, 2011).

The limitations of this small feasibility study must be acknowledged. The dry program was conducted in two small rural schools and this may be a factor that contributed to its success and thereby be a limitation of this study. The wet program was run in a larger metropolitan school with a high proportion of multicultural students. Another limitation of this study was that whilst the local dental agency staff showed support for the program, formal feedback was not obtained. Also, children were not interviewed as part of the study and, as such, their understanding of oral health benefits of brushing or changes in their toothbrushing behaviour at home was not explored.

Conclusion

The findings of this research would suggest that the integration of a supervised toothbrushing program into primary school breakfast clubs may be feasible if the program is adequately supported by staff or volunteers. Whilst the cost of the resources was considered a potential barrier, staffing the program seemed to be the more pressing concern. The high level of continued participation and enjoyment shown by children in the dry program and general willingness to take part were evidence that this program could potentially be more sustainable than the wet program. Larger scale research conducted over a longer period with the inclusion of oral health assessments, child interviews and assessments of pre-and post-home toothbrushing would be highly beneficial.

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Tables and Figures

Table 1: Participating Schools

School number	Program	School Enrolment	Location	Total number of students attending breakfast club	Number of consents to participate in the toothbrushing program	Consent rate for toothbrushing
1	Wet	282	Metropolitan	60	58	97%
2	Dry	29	Rural	29	21	72%

3	Dry	36	Rural	36	27	75%

Table 2: General observations

Program	Observation	Action taken	Resolved
Wet and dry	Children had difficulty opening and closing the container. Breakages occurred.	Assistance provided	Yes, although continuing education was required.
Wet and dry	Children did not always rinse/dry their toothbrush.	Assistance provided.	Children needed reminding.
Wet and dry	Sometimes children misplaced toothpaste/brush.	Replaced toothbrush/container if required.	This was less of a problem in the dry program as children did not go outside to brush.
Wet and dry	Children sometimes did not dispose of paper towel in the bin.	Provided bins close to where the children were brushing and encouraged children to use the bin.	Children needed reminding.
Wet and dry	The names on toothbrushes/containers faded.	Rewrote names on the containers, as the names were also on the toothbrush and the toothpaste.	Waterproof labels may be better.
Wet and dry	Some children did not like the taste of the toothpaste.	No action taken.	Potentially trial different toothpastes in future studies.
Wet and dry	Children could sometimes become excited and wave their toothbrush around.	Explained to the children that this was not acceptable and was potentially dangerous.	Yes.
Wet	Children were excited to go and play. Some children said toothbrushing was boring.	Encouraged children to slow down and brush.	Not completely, was a continuing problem in the wet program.
Dry	Sometimes the children	Taught the children	To a certain

	missed the paper towel when spitting out their excess toothpaste.	how to spit into the paper towel and cupped the paper towel to make it easier for the children to spit into.	degree, although occasionally there were still minor accidents.

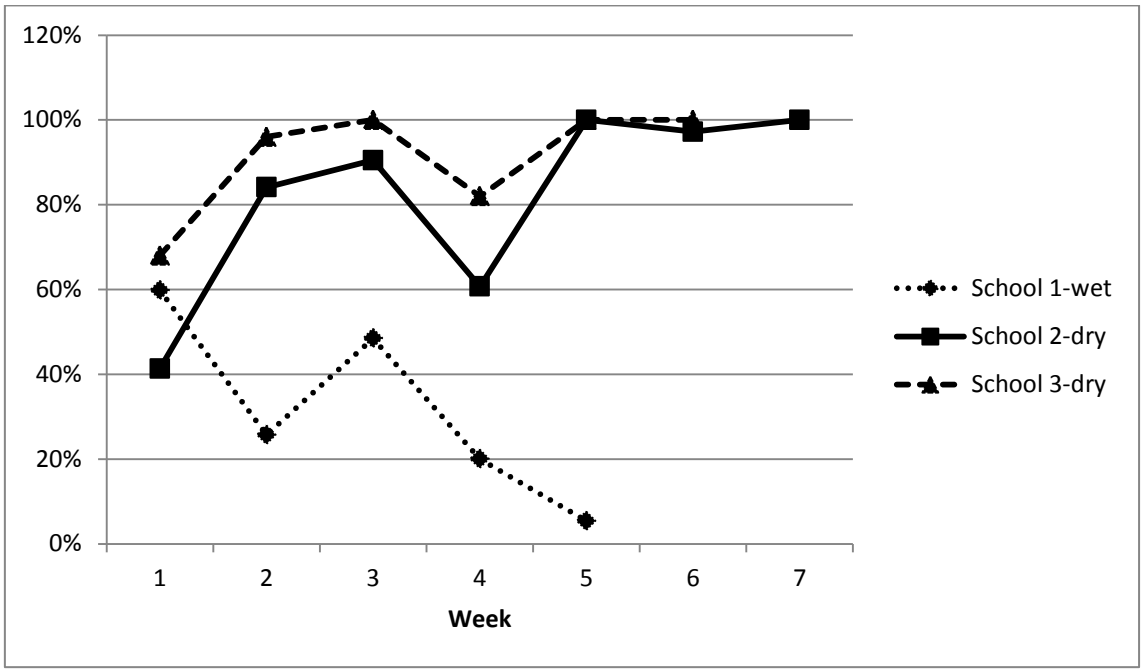

Figure 1: Toothbrushing program participation rate (proportion of breakfast club attendees participating in program)

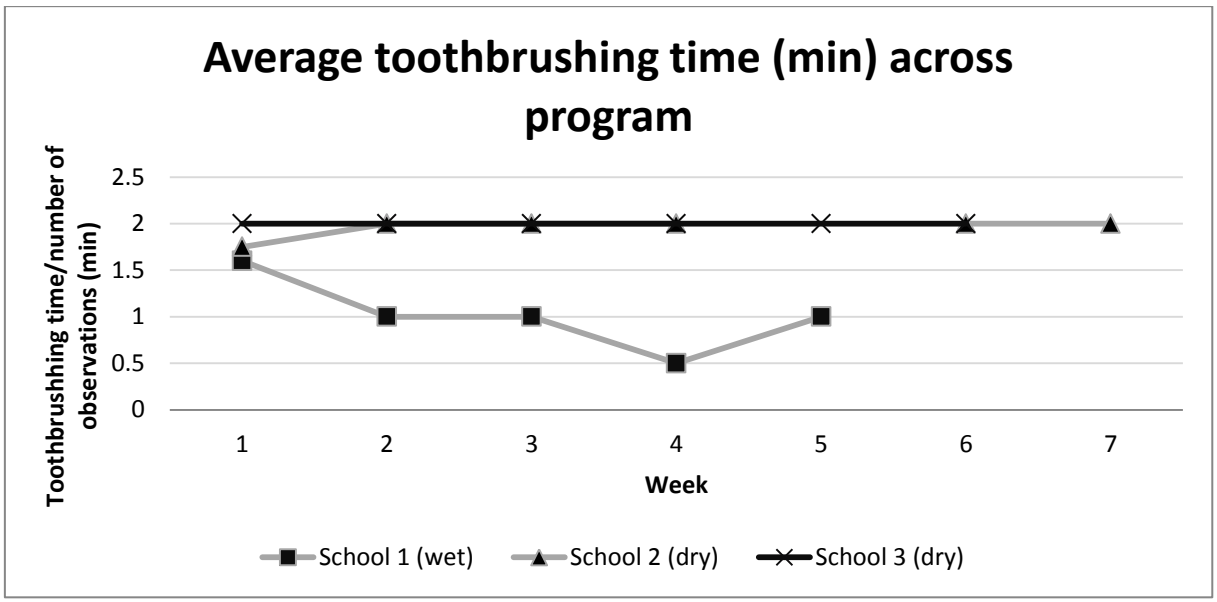

Figure 2: Average toothbrushing times

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