Community Dental Health (2019) **36,** 106–110
Received 27 July 2018; Accepted 31 October 2018

doi:10.1922/CDH_4443Dimitropoulos05

In-school toothbrushing programs in Aboriginal communities in New South Wales, Australia: A thematic analysis of teachers' perspectives

Yvonne Dimitropoulos; Alexander Holden and Woosung Sohn

The University of Sydney

Objective: This qualitative analysis explores how school staff interacted with a daily in-school toothbrushing program in three schools in rural areas in Central Northern New South Wales, Australia, with a high population of enrolled Aboriginal students. ***Research design:*** Three focus groups were conducted in the schools. Participants included school teachers and one Aboriginal Oral Health Aide who manage the daily program. Focus groups were conducted, and where permitted, audio-recorded and transcribed verbatim. Thematic analysis was used to analyse the transcripts. This study was granted ethics approval by the New South Wales Aboriginal Health and Medical Research Council (App 1281/17). ***Results:*** Four themes were identified: 1) Belief of Program Need and Benefit; 2) Forming routine; 3) Children's responses and 4) Sustainability. School staff embraced the program and valued the need for and benefit of the program for children in their school, seeing it as part of the extended role of the school to promote students' health and well-being. Two important enablers for the program's sustainability emerged; promoting and supporting local school leadership and training existing school staff or local Aboriginal people to manage it. ***Conclusion:*** Training local Aboriginal people or existing school staff to implement a daily in-school toothbrushing program and facilitating school leadership is an important enabler for sustainable oral health promotion, including in-school toothbrushing programs, in Aboriginal communities.

Key words: *Toothbrushing; schools; communities*

Introduction

Supervised toothbrushing programs in schools are commonly used as oral health promotion interventions (Dickson-Swift *et al.,* 2017). Their implementation is deemed most appropriate in communities where children brush their teeth with a fluoride toothpaste less than once daily, water supply is non-fluoridated and/or children experience high rates of dental caries (Rogers, 2011). They have been shown to decrease plaque and gingival index scores in children (Gowda and Croucher, 2011), increase oral health awareness (Dental Health Services Victoria, 2011) and form lasting oral hygiene habits (Burnside *et al.,* 2008). Some in-school programs have been effective in reducting the incidence of dental caries (Curnow *et al.,* 2002).

Australian Aboriginal children experience higher levels of dental caries than non-Aboriginal children (Ha *et al.,* 2016). Aboriginal children in rural and remote areas are also less likely to own their own toothbrush at home or to brush their teeth with a fluoride toothpaste daily; almost 8% of Aboriginal children are reported to brush their teeth less than once a day, with just over half brushing at least twice (Jamieson *et al.,* 2007). Lower levels of brushing were associated with lower family incomes and living in a remote or rural area (Jamieson *et al.,* 2007). These factors contribute significantly to an increased risk of developing dental caries (Walsh *et al,* 2010). Infrequent brushing is largely due to the high cost of toothbrushes and toothpaste in these areas, combined with overcrowded housing in Aboriginal communities and not having a safe place to store a toothbrush (Williams *et al.,* 2011). Many programs aimed at promoting the oral health of Aboriginal children include supervised toothbrushing in schools and/or preschools and the distribution of free toothbrushes and toothpaste (Rogers, 2011). Several Australian in-school supervised toothbrushing programs have made positive impacts on the oral health of Aboriginal children (Rogers, 2011). For example, in New South Wales (NSW), a program that included daily toothbrushing, oral health literacy sessions and the provision of toothbrushes and fluoride toothpaste, increased the number of children brushing their teeth twice or more per day and increased ownership of toothbrushes (Buckland and Kennedy, 2008). Another increased oral health knowledge and awareness (Dental Health Services Victoria, 2011).

Whilst studies have shown the success of oral health promotion activities that centre on toothbrushing in schools, few have examined the experiences of teachers and aides to these programs in order to understand possible challenges and barriers to sustainability. This qualitative study explores how school staff interacted with a toothbrushing program within schools situated in rural areas in Central Northern NSW, with a high population of enrolled Aboriginal students.

Correspondence to: Yvonne Dimitropoulos, The University of Sydney, Poche Centre for Indigenous Health, Room 224 Edward Ford building, The University of Sydney, NSW, Australia 2006. Email: yvonne.dimitropoulos@sydney.edu.au

Methods

In Central Northern NSW, Aboriginal children experience high levels of dental caries (Dimitropoulos *et al.,* 2018). In 2014, Aboriginal Elders called for sustainable oral health services and oral health promotion for Aboriginal children living in the region. In response, a needs assessment was completed in collaboration with the local Aboriginal community to ensure strategies were targeted and accepted by them (Dimitropoulos *et al.,* 2018). The assessment revealed low toothbrush and fluoride toothpaste ownership and limited daily toothbrushing among Aboriginal children aged 5 – 12 years. Consequently an in-school toothbrushing program was developed in close consultation with Elders and staff from local schools. Three schools in the region commenced the program in April 2015. In school A, 99% of students identified as Aboriginal, 100% in school B and 70% in school C.

As part of the program, primary school children aged 5 – 12 years brush their teeth once per day in school with a fluoride toothpaste. The co-design of the program by community Elders and schools enables the schools to adapt the delivery methods to suit their local needs. For example, in schools A and B children brush under the supervision of a classroom teacher. In school C, additional support was requested by teachers. In response, the role of an oral health aide was developed, who was a senior Aboriginal student within the school, employed for 1 hour per day to supervise the toothbrushing. The teachers and oral health aide received training on first aid and infection control through a registered training organisation at the beginning of the program. Each child is issued with a toothbrushing kit at the beginning of each school term. The kit includes a toothbrush, fluoride toothpaste and hard plastic storage container with drainage holes to minimise cross contamination and is kept at school to facilitate daily brushing. The program also includes quarterly distribution of free toothbrushes and fluoride toothpaste and dental health education sessions to school children, parents and guardians to encourage toothbrushing at home and increase oral health awareness.

One focus group was conducted with staff in each of the schools in December 2017. In school A, four teachers participated; in school B, eight participated and in school C, two teachers and the Oral Health Aide participated. Focus groups were guided by semi-structured questions that acted as prompts for participants to discuss certain key topics, whilst allowing freedom to explore other aspects of the program. Questions included prompts on how the program was implemented and whether the staff encountered any issues with its administration, organisation or running. Consent was sought from school principals to conduct and record the focus groups. Consent was granted from school principals in schools A and C to audio-record the focus groups which were transcribed verbatim. In school B, consent to audio-record was declined. Instead, hand written notes were taken by the two facilitators. The notes did not form part of the formal analysis, but were used to inform the coding process and develop the themes.

Thematic analysis was chosen to analyse the transcripts of the two audio-recorded focus groups in six phases; 1) familiarisation with the data through reading and re-reading; 2) coding aspects of the data systematically to generate initial codes; 3) organising codes into themes; 4) reviewing and refining the themes; 5) naming the themes and 6) producing the final report (Braun and Clarke, 2006). Transcripts were read cyclically by YD who developed a preliminary coding structure. That structure was reviewed to develop initial themes. These potential themes were refined and named by YD and AH through discussion. No disagreements as to the coding classification arose. Had this been the case, disagreements would have been decided by WS. In case of the third (unrecorded) focus group, the notes were read and used to compliment the themes generated from the analysis of the other groups. The study was granted ethics approval by the Aboriginal Health and Medical Research Council (App 1281/17). All participants were issued with a participation information statement and signed a consent form before each focus group.

Results

Four themes were identified; 1) Belief of Program Need and Benefit; 2) Forming routine; 3) Children's responses and 4) Sustainability.

Belief of Program Need and Benefit

Staff believed in the need for the program to be implemented in their schools as the children did not always brush their teeth at home. They also noted the bad breath of children during class before implementation. "I was always for it [the toothbrushing program]. I think it's good, because they [school children] don't always brush their teeth at home and I remember when I first started at this school that the breath on the kids was quite bad". The participants expressed their desire, and that of their colleagues, for the program to continue; "she [the school principal] really wants it to keep going. And I think it's necessary, and especially now because we're doing a breakfast program, so the kids are coming to school, especially all our younger ones, are having a piece of toast and then [the oral health aide] starts [the toothbrushing program] straight away." Attitudes towards the program were expressed positively, with participants calling them, "great" and "fabulous". When asked whether the program was benefiting the children, the responses included; "Oh, yeah" and "Immensely". Some participants expressed that at the beginning of the program, they had concerns about how the process of the toothbrushing would work, but were supportive even at this early stage; "I was always happy for it to happen. I think still happy for it to continue. It's beneficial." This theme links closely with that of Forming Routine as several participants felt the development of a routine and incorporation of oral hygiene within that routine benefited the children. There was a general belief that the program was beneficial for developing the children's appreciation for the importance of their oral health.

Forming Routine

The formation of a routine based around daily toothbrushing emerged as a theme. All participants described the way children in their school or class brush their teeth each day and

how it had become part of their school routine. This linked closely with the previous theme of Perception of Program Need and Benefit. When asked about the best part of the program, one participant stated; "I just like the routine of it every day." The program had become embedded into the daily routine in every school, despite being implemented differently in each one, even with subtle differences being apparent between classrooms within the same school.

The incorporation of oral hygiene with other hygiene procedures was reported in several classrooms in two schools; "In the kindy room, as well, they come in, they sanitise their hands, they blow their nose, and then they do their teeth" and, "I think it's a nice start to the day, for them to feel really fresh." The routine was described as an integral component of the start of the school day with one teacher reporting; "They [children] come in in the morning, first thing, and they just go and brush their teeth straight away. And if they come late, that's what they do, straight away, anyway, it's just instant, as they walk in." and "It's part of the roll-marking and stuff in the morning. They come in and brush their teeth, put their bag down, and mark the roll and stuff like that."

Some participants expressed initial concern with how the program might fit into the day's activities but explained how the program became routine, embedded into existing daily activities. "I think initially we probably had concerns, because the day's so busy, and thinking about how to fit everything in. But it's actually slotted in really well... While one group's marking off their attendance charts the other group's brushing their teeth." and, "I thought, "How are we going to fit this in, and it's going to be a disaster having all of these kids at the sink." But once we had the routines in place, not a problem at all. It's very positive." One school had attempted to run the program as a whole-school activity in the morning, which had not been successful, however, after it had become classroom-based, things worked much better.

Child responses

Two types of responses towards the program emerged from the children. There was acceptance, mainly from younger children, and resistance, typically from older children or those described by the supervising teachers as having behavioural issues. One staff member described how the children were often excited to engage in toothbrushing at school and how they approached the program with enthusiasm; "In my class…they're quite excited. They all come in and they know that they've got to do the two-minute timer." Where some children expressed resistance, one participant described how the children would encourage them. "There is one boy in my class that doesn't like to do the two minutes, just likes to rush through it, and the kids pull him back and go, "No, no, you haven't finished, you need to go back." So that's good." Some children were also described as being keen to brush due to a desire to participate with their peers; "They all know that they need to come in and brush their teeth…because they want to, because everyone else is as well. I think that's been good."

Participants felt that; "they [the children] like having clean teeth" although there were conflicting reports of the children's response to the toothpaste, with one school stating that the children liked the taste of the toothpaste, and another stating that they had struggled in getting the students to accept its mint-flavour. Some schools reported that they had faced challenges in getting some children to engage. This issue had been managed through the activity of an oral health therapist coming into the classroom and reinforcing the process and importance of the program; "I think that when [the oral health therapist] comes in once a term, at the beginning of the term, it's really good as a refresher." In one school, the oral health aide, took on the role of coordinator and troubleshooter; "[the oral health aide] made the call to do the older kids after lunch, and it was mainly because…the older kids were saying they'd brushed their teeth in the morning, so…a lot of them were like, "No, I don't want to brush now," and we're finding after lunch that they're happy to do it because they've eaten and it's just an extra toothbrushing time." Staff described difficulties in managing some of the children misusing toothpaste; "Earlier we had the issues with the toothpaste…that was frustrating, but that's a behaviour management issue for us, as teachers, that's a whole lesson in about respecting resources and all of that sort of thing." Some classrooms had a dispenser to manage this issue. Across the focus groups, staff described modifying the program in their school or classroom to minimise the resistance from children. One participant described removing individual tubes of toothpaste from each student's kit dispensing the toothpaste onto a laminated sheet with small circles for each child to scoop individually; "I think we had to do that at the start of the year because the older kids were going a bit crazy with the toothpaste. They needed a bit more supervision than the little ones."

Sustainability

Staff described embedding the program into their daily routine and modifying its implementation when necessary. This flexibility and adaptability enabled the program to continue in their school or classroom, rather than cease. The narrative within the focus groups demonstrated a willingness on the part of the staff to modify the program to ensure its continuation. Even though toothbrushing is implemented differently in each school or classroom, attaching toothbrushing to an existing daily activity such as after breakfast club or during reading groups was consistent. As shown within the theme of Belief of Program Need and Benefit, the participants felt that the program was worthwhile and important in promoting the oral health of the children. This contributes to whether such programs are sustainable. The positive attitude demonstrated by the staff towards the program and their perceptions of value are important; "Some… really want to improve their dental health…It's something they can do for themselves to improve their health, and it's something they've got control over." Having the oral health aide recruited from the older-student body also had positive effects on engagement with the children; "I think the kids respond really well with having [oral health aide] there, and it's not a teacher doing it. The teachers are supervising, but [the oral health aide's] got charge of it. I think it's a really good role model for our older students."

Discussion

Improving the oral health of Aboriginal children is both an NSW and wider Australian health priority.

The NSW Aboriginal Oral Health Plan and the National Strategic Framework for Dental Health Oral Health 2020 recommend partnership with Aboriginal communities to develop evidence based and sustainable oral health promotion programs (Centre for Oral Health Strategy, 2014; NSW Ministry of Health, 2013). Supervised in-school toothbrushing programs can have positive impacts on oral health. Studies evaluating their effectiveness have shown reduced plaque and gingival index scores, reduction in the incidence of dental caries, increased oral health awareness and lasting oral hygiene habits (Gowda and Croucher, 2011; Department of Human Services Victoria, 2011; Burnside *et al*., 2008; Curnow *et al*., 2002). Therefore, in Aboriginal communities that may not have access to community water fluoridation due to remoteness or where children do not brush their teeth daily, supervised toothbrushing programs may assist in improving the oral health of Aboriginal children in Australia. Toothbrushing programs often face criticism due to their unsustainability or implementation barriers in the face of other demands on teachers' time and infection control problems (Rogers, 2011). This study is important as it describes the experiences of three schools implementing a daily toothbrushing program and provides insight into the barriers and enablers towards implementing similar programs in Aboriginal communities. The programs implemented in Central Northern NSW have been operational in three schools for 18 months. Only one school (school A) reported an issue with infection control. In this instance, children misused toothpaste. The teacher modified the program removing all toothpaste tubes from children's toothbrushing kits and dispensing toothpaste onto a dispensing chart. Potential infection control issues were mitigated by providing formal training in infection control for the teachers and oral health aide at the beginning of the program.

School staff embraced the program and reported having an appreciation of the need and benefit of it for children in their school, seeing it as part of the extended role of the school to promote students' health and wellbeing. Although oral health status was not measured in this study, teachers believed that the program was beneficial for children's oral health as it enabled them to form oral hygiene routines, place importance on their oral health and may contribute to forming good oral hygiene habits. In schools A and B, existing school teachers were trained to manage the program. In school C, an oral health aide – in the form of an older student – was employed. Despite the differences in supervision between the schools, in all three schools toothbrushing became embedded into existing daily activities which enabled it to become part of the daily school or classroom routine. This can be attributed to two important enablers of this program; local school leadership of the program accompanied by training existing school staff; and introducing a local oral health aide, rather than relying on external oral health professionals.

Each school took leadership of the program, modifying and adapting it to ensure that it fitted within the nuances of situation. In instances where it encountered barriers, such as difficulties engaging children; managing behaviours including misuse of toothpaste or operating the program as a whole school activity, the culture of the program promoted flexibility rather than enforcing strict adherence to a protocol. In these instances, staff and the oral health aide made autonomous decisions to modify the program, which allowed it to continue without interrupting the school day. Such changes included the time to begin toothbrushing, changing to a classroom-based activity or dispensing toothpaste onto a laminated chart. Because members of staff saw benefit in the program, where barriers were encountered, these were negotiated successfully, rather than the programs being ceased or cut-back.

The distribution of dental professionals in NSW is uneven; with oversupply in metropolitan areas and short supply in rural and remote areas (Australian Institute of Health and Welfare, 2016). Therefore, relying on dental professionals to implement oral health promotion in rural and remote areas is unsustainable. This program trained existing teachers and a local Aboriginal person as an oral health aide to manage it locally. This approach reduces reliance on external dental professionals and is an important enabler for program sustainability. The role of an oral health aide was introduced into this program to alleviate the demands on teacher's time and promote a culturally competent environment for children to brush their teeth at school. It is based on the Canadian Oral Health Initiative and Alaskan Dental Health Aide program where local First Nations people have been trained in the application of fluoride varnish and provision of dental health education in response to high caries levels experienced by Indigenous children; so improving their access to culturally competent preventive dental health services (Mathu-Muju, 2016; Shoffstall-Cone and Williard, 2013). In school C, the oral health aide (an older student) was seen as a positive role model for students and assisted in student participation and reduced the direct management of the program by teachers. The role of an Aboriginal oral health aide may help deliver sustainable and culturally competent oral health promotion; especially with further training to potentially include the application of fluoride varnish and dental health education. Oral health aide roles may provide employment for Aboriginal people, contributing to community development in rural and remote communities.

Limitations

Consent was not granted by one school to record the focus group. While handwritten notes were taken, the data collected were not included within the formal analysis. The notes were used to compliment the themes generated from the two focus groups, however the findings of this study may have differed had all three groups been included in the analysis. Teacher's perceptions of the program were positive overall and demonstrated that they believed the program was of benefit to the children. This may be because the programs were implemented in a well-supported context, where the school principal and local Aboriginal communities had advocated for the program. Findings may have been less positive if the programs had not been implemented within such a supportive environment.

However, much of the support given to this intervention by the school and local community was due to the collaborative approach in identifying community health needs and priorities from the outset of this program.

Conclusion

Training local Aboriginal people to implement a daily in-school toothbrushing program and facilitating school leadership was an important enabler for sustainable oral health promotion in Aboriginal communities. Community ownership of the program contributed to its sustainability. Community consultation and flexibility should be important considerations in developing oral health promotion implemented in Aboriginal communities.

References

Australian Institute Health and Welfare (2016): Spatial distribution of the supply of the clinical health workforce 2014: relationship to the distribution of the Indigenous population. Retrieved July 20 2018, from https://www.aihw.gov.au/reports/indigenous-health-welfare-services/spatial-distribution-of-thesupply-of-the-clinical-health-workforce-2014-relationship/contents/table-of-contents.

Braun, V. and Clarke, C. (2006): Using Thematic Analysis in Psychology. *Qualitative Research in Psychology* **3**, 77-101.

Buckland, A and Kennedy, C. (2008): Clean teeth, wicked smiles 2007 toothbrushing program evaluation. Retrieved July 16 2018, from http://oralhealth.circumpolarhealth.org/item/clean-teeth-wickedsmiles-2007-toothbrushing-program-evaluation.

Burnside, G., Pine, C., Curnow, M., Nicholson, J. and Roberts, A. (2008): Long-term motivational effects of an RCT of supervised toothbrushing. (Abstract) *International Association of Dental Research*, Toronto.

Centre for Oral Health Strategy (2014): *NSW Aboriginal Oral Health Plan 2014–2020*. Sydney: NSW Ministry of Health. Retrieved May 30 2018, from http://www.health.nsw.gov.au/oralhealth/Publications/aboriginal-oral-health-plan.PDF.

Curnow, M., Pine, C., Burnside, G., Nicholson, J., Chesters, R., and Huntington, E. (2002): A randomized controlled trial of the efficacy of supervised toothbrushing in high-caries-risk children. *Caries Research* **36**, 294-300.

Dental Health Services Victoria (2011): *Smiles 4 Miles: Early Childhood Services Toolkit*. Retrieved July 15 2018, from https://www.dhsv.org.au/oral-health-programs/smiles4miles

Dickson-Swift, V., Kenny, A., Gussy, M., de Silva, A., Farmer, J. and Bracksley-O'Grady, S. (2017): Supervised toothbrushing programs in primary schools and early childhood settings: A scoping review. *Community Dental Health* **34**, 208-225.

Dimitropoulos, Y., Gunasekera, H., Blinkhorn, A., Byun, R., Binge, N., Gwynne, K., and Irving, M. (2018): A collaboration with local Aboriginal communities in rural New South Wales, Australia to determine the oral health needs of their children and develop a community owned oral health promotion program. *Rural and Remote Health* **18,** 44-53.

Gowda, S. and Croucher, N. (2011): *School-based toothbrushing programme in a high-risk rural community in New Zealand–an evaluation*. Northland District Health Board, Whangarei, New Zealand.

Ha, D., Roberts-Thomson, K., Arrow, P., Peres, K., and Do, L. Children's oral health status in Australia, 2012–14. In*, Oral Health of Australian Children: the National Child Oral Health Study 2012–14*; ed. Do, L., and Spencer, A., pp86-153. Adelaide: University of Adelaide Press.

Jamieson, L., Armfield, J., and Roberts-Thomson, K. (2007): Oral health of Aboriginal and Torres Strait Islander children. *Australian Institute of Health and Welfare*, Retrieved May 30 2018, from https://www.aihw.gov.au/getmedia/65f1b8fa-9f64-48ad-87f7-c15247c7bb0a/ohoaatsic.pdf.aspx?inline=true.

Mathu-Muju, K., McLeod, J., Walker, M., Chartier, M., and Harrison, R. (2016): The Children's Oral Health Initiative: An intervention to address the challenges of dental caries in early childhood in Canada's First Nation and Inuit communities. *Canadian Journal of Public Health* **107**, 188-93.

NSW Ministry of Health. *Oral Health 2020: A Strategic Framework for Dental Health in NSW*. Retrieved May 30th 2018, from http://www.health.nsw.gov.au/oralhealth/Publications/oral-health-2020.pdf.

Rogers, J. (2011): *Evidence-based oral health promotion resource*. Melbourne: Government of Victoria. Retrieved May 30 2018, from https://www2.health.vic.gov.au/getfile?sc_itemid=%7b82AF49BB-860C-4F2A-A4F1-B0D4A6FE70A6%7d&title=Evidencebased%20oral%20health%20promotion%20resource%20.

Shoffstall-Cone, S., and Williard, M. (2013): Alaska Dental Health Aide Program. *International Journal of Circumpolar Health* **72**, 10.304.

Walsh T., Worthington H., Glenny A., Appelbe P., Marinho V., Shi X. (2010): Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 1, CD007868.

Williams, S., Jamieson, L., MacRae, A., and Gray, C. (2011). Review of Indigenous oral health. *Australian Indigenous Health Bulletin* **11**, 1-17.