



Challenges associated with implementation of a school-based tooth-brushing and fluoride varnish programme in a diverse and transient urban population

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Public health competencies being illustrated; Planning, delivery and evaluation of health improvement programmes, addressing health inequalities, awareness of cultural impacts on health and wellbeing.

Smile4Life, a schools-based, evidence informed oral health promotion programme was designed to address high levels of oral health need and inequality within a UK City. The aims of the pilot were to test the feasibility of delivering the programme (supervised tooth-brushing, take home kits, educational resources and application of fluoride varnish) in six culturally diverse schools in disadvantaged neighbourhoods, and evaluate its impact on caries prevalence. High levels of participation were achieved (98% positive consent), however, only 44% received more than one application of fluoride varnish. A reduction in decay prevalence and improved oral hygiene were observed. This paper examines the challenges faced in working with transient and culturally diverse population groups, working effectively with schools to deliver an effective intervention for this population, and in responding effectively across agencies to address safeguarding concerns.

Key words: Fluoride Varnish, Tooth-brushing, Inequalities

Rationale for developing the Smile4Life pilot

Poor oral health is more prevalent in deprived areas and also amongst some ethnic groups. Language and cultural factors present additional barriers to access for both prevention and treatment services. Involving schools and Early Years settings in establishing early, good oral health habits may be expected not only to prevent children from suffering needless pain, but also to save public resources by minimising treatment need. The Marmot Review (Marmot *et al*, 2010) highlighted the importance of the early years in affecting health and wellbeing throughout the life course.

Local health need

Children in Derby City, in the East Midlands region of England, have poorer oral health compared to the national average. The results of the 2011/12 survey of 5 year olds demonstrated that 31.0% of five year olds in Derby had experience of dental decay, which was greater than the average for both England (27.9%) and the East Midlands (29.8%). Whilst the average number of decayed missing or filled teeth (dmft) for the children examined was 1.1, for those with disease experience this was 3.5, (England – 0.9, 3.4; East Midlands – 0.9, 3.1) (Public Health England, 2013).

Solution proposed

In response to this identified high level of oral health need in Derby, Smile4Life, an 18 month pilot schools-based programme, was designed drawing on the principles and learning of comparable UK programmes ('Designed to Smile' in Wales, and 'Childsmile' in Scotland) where preventive oral health promotion programmes have been successful in reducing oral health inequalities through supervised tooth-brushing, oral health education and application of fluoride varnish.

There is good evidence that fluoride varnish is effective in preventing dental caries in children and adolescents (Marinho, 2009; Public Health England, 2014). Establishing regular tooth-brushing at least twice a day with fluoride toothpaste into the daily routine of high-risk children has the potential to reduce inequalities in dental health (Curnow *et al*, 2002) and school-based supervised brushing programmes (both standalone and as part of multi-component programmes) have been associated with improved dental health (MacPherson *et al*, 2013; de Silva *et al*, 2016). It is recommended that local authorities provide oral health improvement programmes in Early Years services and schools in areas where children and young people are at high risk of poor oral health (PHE, 2014, NICE, 2016).

The aim of the pilot was to test the feasibility of delivering supervised tooth-brushing and fluoride varnish applications in six culturally diverse schools in disadvantaged neighbourhoods, and to evaluate its impact on caries prevalence.

Children were examined at baseline and the end of the pilot by a trained and calibrated dentist using the BASCD criteria (Pitts *et al*, 2007). At baseline 48.0% of 4-5 year old children examined had evidence of active dental decay compared to 24.7% in England, and 27.6% in Derby City, examined in the 2014/5 5-year-old survey. At baseline the children in the pilot had a mean d_3mft of 2.9, compared to the mean in Derby of 1.3 d_3mft and England mean of 0.8 d_3mft . This highlighted stark local inequalities in children's oral health, which together with evidence from school visits for fluoride varnish application that children were not accessing care, led to safeguarding concerns being raised within the Local Authority.

The programme, described in Figure 1, was designed to reach up to 500 children and accommodate the culturally and socially determined fluctuations in school populations within the programme. The programme started in September 2013 in nursery (age 3-4 years) and reception (age 4-5 years) and moved with the children as they progressed into their next academic year.

Challenges addressed

Sharing Concerns and Information

In response to the local Safeguarding Board a multi-stakeholder task and finish group was established by Derby City Council to ensure appropriate processes were in place so that concerns about sharing information about oral health and safeguarding could be properly investigated and examined. The group developed a protocol which facilitates sharing of concerns about dental neglect in children and this was distributed to all to enable general dental practices in the county.

Working with Schools

An evaluation survey of school staff identified the challenges of managing the programme alongside other pressures on the timetable. All schools responded, with 75% of staff involved in delivering the programme completing a questionnaire. Overall, the comments were positive and staff noted the commitment of the Smile4Life team to help facilitate the implementation of the programme. After some initial resistance to the perceived additional burden of programme delivery, staff reported that it was easy to incorporate the programme into classroom topics and they were able to see clear links to the Early Years curriculum and that the programme contributed to OFSTED themes.

Gaining consent

Gaining parental consent was by far the most time-consuming aspect of the programme. Due to the high turnover of the school roll, this process was continual throughout the pilot period. Careful consideration was given to the complex nature of working with diverse population groups and the importance of ensuring parents were able to make an informed decision. This resulted in frequent visits to schools to meet with parents at the beginning and end of the school day.

Cultural diversity and language barriers

Participating families were an ethnically diverse group, as illustrated by figure 2. Language barriers were perhaps the most difficult and challenging aspect of the pilot. In one school 26 languages were spoken, and literacy levels were low amongst some parents. The Smile4Life team were supported by interpreters working within the schools and it was agreed to translate written materials into the four most commonly spoken languages. Additional costs were incurred for further translation of referral letters to parents. It was noted that some parents did not have a written language, a barrier that was overcome by use of pictorial aids to support verbal dialogue in gaining consent.

Pilot intervention description

Pre and post-programme dental examination, carried out by a trained and calibrated dentist (and signposting to care for those with treatment need)

Implementation of tooth-brushing programmes in schools, including staff training.

Dissemination of take-home tooth-brushing kits

Development of a curriculum pack and educational resources to promote oral health messages, with clear links to the Early Years Foundation Stage curriculum, PSE development, communication and language, and physical development

Two applications of fluoride varnish by a dental team member within 18 month pilot period

Pre and post-programme validated parent questionnaires (Van den Branden, 2013) about child's oral health behaviours, translated into appropriate languages

Pilot outcomes

Six schools participated in the programme (all nursery and reception classes), including training of co-ordinators

98% positive parental consent for participation

455 children received fluoride varnish (of whom 44% received two applications), tooth-brushing kits, and participated in supervised tooth-brushing

A reduction in decay, as defined by BASCD criteria, was observed (mean d_3mft 2.8 at baseline to 2.2 at follow-up)

Significant increase in oral cleanliness

Parents reported:

Increased frequency of home tooth-brushing

Increased dental attendance (children not yet visited a dentist: 23.9% at baseline, 7.5% at follow-up)

No significant change in consumption of sugary snacks and drinks

Figure 1. Pilot intervention description and outcomes

This partnership working with schools proved effective and demonstrated the benefits of a locally supportive approach which can be applied to other health improvement programmes.

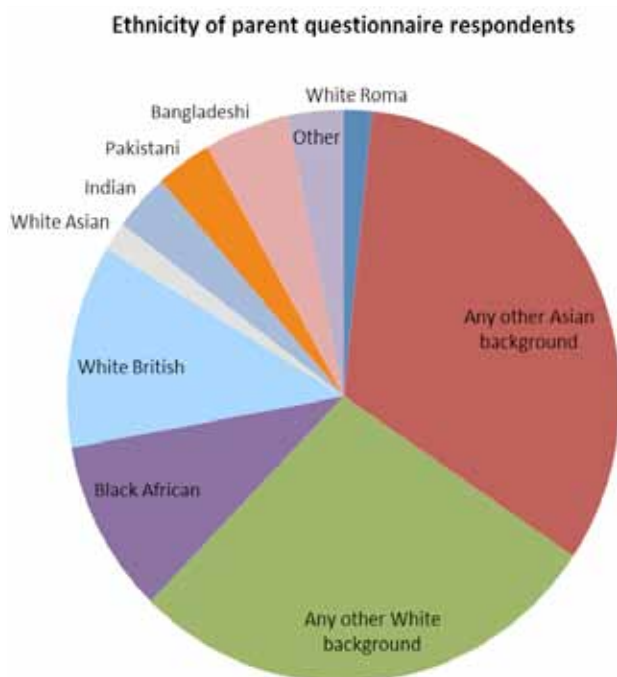


Figure 2. Ethnicity of parent questionnaire respondents

Some translated consents and medical histories were returned in the spoken language and further delays were incurred in translating these back into English before fluoride varnish could be applied. Future programmes would need to consider the level of translation required and costs involved.

Accessing care

Language barriers also exacerbated difficulties families had in accessing dental care. Anecdotal reports from parents, school health teams and school staff in suggested that there had been difficulties in accessing care from local dental practices. Some practices were cited as either not taking on new patients or having long waiting lists, and there were reports of families being turned away as they could not speak English. Conflicting messages regarding the age at which some dentists would see a child added further complexity. There is no lower age limit for a child to receive free dental care within the NHS. Where issues with particular practices had been raised, the local NHS England team addressed these concerns directly with the practice.

It was noted, after the second fluoride application, that just under half of those parents who had been advised to seek care at baseline reported they had not accessed a GDP in the interim period. Parental feedback provided insights into the barriers they experience in trying to access services. These include cultural norms, language, lack of understanding of the NHS dental system, fear, mistrust, and lack of NHS capacity from dental practices.

Access issues highlighted by the pilot also supported the case made for commissioning additional recurrent capacity in local dental practices.

The pilot demonstrated a relatively high prevalence of active tooth decay in children from Eastern European and Middle Eastern groups. This supports evidence that tooth decay is more prevalent in certain minority ethnic groups.

Whilst there was no dietary intervention within the pilot, the parental questionnaire did explore sugar consumption. Whilst no significant change in the provision of sugary snacks/drinks was reported, there was a significant increase in parents' level of perceived behavioural control between baseline and follow-up, suggesting that parents felt it would be easier to adopt more desirable oral health behaviours. The perceived behavioural control domain had the lowest mean score at baseline, suggesting that parents found it difficult to adopt desirable oral health behaviours. In contrast, intention scores were higher at both baseline and follow-up, suggesting that parents' intentions were good, but barriers prevent or limit adoption of good oral health practice.

Parents' attitudes, towards, and beliefs about, going to the dentist were also in some part culturally determined. Some believed, mistakenly, that the baseline examination at school constituted a full dental examination and therefore their child did not need any further visits; this may explain why referral letters were not acted upon. The pilot also highlighted a lack of understanding of how dental services are organised, and that preventive dental care is unfamiliar to those who have little or no previous experience of accessing dental care.

Transience of population

The transience of a proportion of the target population was culturally and socially determined. Families moving into and out of the area, or returning to their country of origin for a period, complex family structures, insecure housing, and cultural norms relating to school attendance were the principle mediating factors. The movement of children on and off, and between, school registers made management and monitoring the programme a challenging task. Seeking consent and data collection were difficult and time-consuming. Future programmes should recognise the need for good communication with the school co-ordinators to maintain active class lists regularly updated with consent status. These are, however, challenges that any health improvement programme will experience within similar settings.

Only 44% of the participants (455) received two applications of fluoride during the pilot and this was a reflection of the mobility of this school population and highlights the difficulty in delivering sustained interventions, such as fluoride varnish programmes, and achieving better outcomes, when working with transient communities.

Targeted programmes such as this would usually include fluoride varnish application at 6 monthly intervals. This programme was planned and commissioned without recourse to specialist dental public health advice, hence only two applications were commissioned during the 18 month pilot period. This, together with the poor application rate, further limits the potential effectiveness of the programme and highlights the importance of specialist advice into the design of programmes.

Future implications

- Further work is required with GDPs to increase uptake of dental attendance for young children, and to increase the provision of fluoride varnish within general dental practices.
- Any future fluoride interventions should specifically target highly vulnerable and static target groups, so benefits are maximised and inequalities reduced.
- In transient populations, more creative, alternative models of delivery for oral health promotion interventions may need to be developed to ensure these populations are not disadvantaged by mainstream services.
- The development of more sustainable information-sharing practices between dental teams and other practitioners is recommended.
- An integrated approach - with oral health promotion being a key element in existing and future mainstream service provision, using a multi-agency and an evidence-based approach - is recommended (Jürgensen *et al.*, 2013).

Learning points

- Specialist dental public health advice should be sought prior to establishing an oral health improvement programme. Piloting of comprehensive programmes reveals local issues that need to be addressed before a substantive intervention is rolled out
- The cultural needs, expectation and understanding of local communities need to be understood and addressed if health interventions are to be successful and these extend beyond the challenges of communication
- Where a population is transient, programmes which take place over several life stages may benefit individuals but not show a measurable benefit at population level
- Where oral health interventions involve actions to increase attendance at general dental practices, preparatory work is required with commissioners, providers and local dental leaders and opinion-formers to ensure attendances which benefit participants of the scheme can be made

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