

The promotion of oral health in health-promoting schools in KwaZulu-Natal Province, South Africa

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Background. Oral health promotion is a cost-effective strategy that can be implemented at schools for the prevention of oral diseases. The importance and value of school-based interventions in children has been identified in South Africa (SA). Although oral health strategies include integrated school-based interventions, there is a lack of published evidence on whether these strategies have been translated into practice and whether these programmes have been evaluated.

Objective. To assess the efficiency and sustainability of the toothbrushing programme implemented at health-promoting schools in KwaZulu-Natal Province, SA.

Methods. A mixed-methods approach was used for this study, conducted at 23 health-promoting schools in KwaZulu-Natal using focus group discussions. Triangulation was used for evaluation.

Results. The intervention implemented had created awareness of oral health for learners, educators and parents. Findings in this study indicate that although there were benefits obtained from this school-based intervention, many challenges, such as time constraints, large classes and a lack of adequate resources and funding, affected the sustainability of the programme.

Conclusion. The school setting has the potential to deliver integrated preventive and promotive programmes provided they are supported by adequate funding and resources.

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Oral health promotion has been identified as a cost-effective strategy to reduce the burden of oral diseases in local communities in South Africa (SA).^[1] Although most oral diseases are preventable, they are irreversible once established and affect function and quality of life.^[2] Oral health promotion strategies therefore support preventive interventions. Lifestyle behaviours such as consuming foods and drinks high in sugars, smoking and drinking alcohol can affect oral health.^[3] These behaviours are controllable in school settings through school policies, adjusting the physical environment and implementing education in oral health.^[2] Schools, attended by over a billion children worldwide, have been identified as the most creative and cost-effective way of improving oral health and thereby quality of life through school-based interventions. These interventions provide the foundations for healthy patterns of behaviour that follow into adulthood.^[3,4] International reviews conducted by The Cochrane Collaboration were inconclusive on the effectiveness of school-based interventions.^[5] However, studies conducted in China, Indonesia, Brazil and Iran show positive results.^[6-8] The importance and value of the impact of school-based interventions on children has been identified in SA.^[9] SA oral health policies and strategies have therefore prioritised school-based preventive programmes.^[10] The Oral Health Ten Point Plan 2011 - 2015 for KwaZulu-Natal Province includes integrated school-based toothbrushing, fissure sealant, screening and education programmes.^[11] However, there is a lack of published evidence on whether these strategies have been translated into practice and whether the programmes have been evaluated. Evaluation generates information that can be utilised by stakeholders responsible for the improvement of interventions which ensures effective interventions, high-quality practice, maximised use of limited resources, provision of feedback to all participants and informed policy development and implementation.^[12,13] Evaluation, which includes both process and outcome data, should be a key component in planning school oral health promotion programmes.^[14] Documenting and publishing

these interventions enables the sharing of knowledge globally.^[15] However, international reviews indicate that current evaluation outcome measures are inappropriate and of poor quality.^[16] Process evaluation data inform future planning and delivery, while outcome data assess the short-, medium- and long-term effects of the intervention.^[17] This study evaluated the short-term effects of the intervention for efficiency and sustainability. The aim was to evaluate an implemented toothbrushing programme at health-promoting schools in KwaZulu-Natal to test for efficiency and sustainability. This study formed part of a bigger study that examined the viability of incorporating oral health promotion into the Health-Promoting School Initiative in KwaZulu-Natal. The study was divided into three phases, namely assessment (phase 1), implementation (phase 2) and review (phase 3).

Methods

This study was conducted at 23 health-promoting primary schools, randomly selected from a total of 154, in the 11 districts of KwaZulu-Natal. Fig. 1 illustrates details of school participation.

A situational and needs analysis was conducted in phase 1 using interviews, questionnaires, a data capture sheet and the World Health Organization Decayed Missing Filled Teeth Tool (WHODMFT Tool). In phase 2, appointments were made telephonically with the school health teams of the 20 consenting schools to report on phase 1 of the study, formulate and implement interventions based on learners' needs and sign a memorandum of understanding for interventions. Discussions included:

- a toothbrushing programme
- instructions on toothbrushing technique, toothpaste application and toothbrush storage
- parental involvement
- outsourcing supplies
- incorporating oral health education into school curriculum and at parent meetings

- sugary snacks control by vendors and tuck shops
- healthier lunches.

Toothbrushes and a 3-month supply of toothpaste were provided to commence the programme. A mobile messenger application was set up between the researcher and school health teams for ease of communication and sharing of ideas between schools.

This article reports briefly on phase 1 and focuses on the evaluation of the toothbrushing programme using focus group discussions in phase 3 of the study. Twenty schools were given appointments for focus group discussions; however, only 13 schools were visited owing to rains ($n=2$) and unavailability for scheduled appointments ($n=5$). Focus group discussions, lasting 30 - 45 minutes and recorded with participants' permission, were conducted 6 months after the implemented programme for insight into their programme experience. Discussions focused on opportunities, challenges, benefits and support available for this intervention. Qualitative responses were transcribed verbatim, examined for broad categories and then further categorised into phenomena using open coding. Links were then formed between categories (axial coding), after which selective coding was used to create core categories.^[18] Quantitative responses were analysed using SPSS version 21.0 (IBM Corp., USA). A concurrent mixed-methods approach with both qualitative and quantitative data was therefore used. To ensure validity, data source triangulation, which entails gathering evidence from diverse sources and drawing conclusions based on data collected, was used for evaluation.^[19,20]

Gatekeeper permission was obtained from the Department of Health and the Department of Basic Education. The study was approved by the Humanities and Social Sciences Research Ethics Committee of the University of KwaZulu-Natal (UKZN) (ref. no. HSS/0509/013D). The UKZN ethical guidelines were used to ensure confidentiality, consent to conduct interviews and data management.

Results

Twenty-three schools participated in phase 1 of the study. Quantitative responses in the questionnaire indicated that 55% of the schools had toothbrushing programmes. However, further investigations of school records and qualitative questionnaire responses established that these programmes did not occur regularly.^[21] Data capture sheet responses indicated that health messages formed part of the curriculum in the majority (96%) of the schools. However, staff indicated that they were not confident in conducting oral health promotion programmes owing to a lack of basic knowledge about oral health.^[21] Results obtained from the WHODMFT Tool (Table 1) indicated that only 27% of the learners were caries free, with the majority (90%) requiring preventive care.^[22]

A total of 2 065 grade 1 learners from 20 schools participated in the toothbrushing programme. This article reports only on feedback received from 13 schools that participated in phase 3 of the study. Table 2 illustrates the frequency of the toothbrushing programmes per week that were conducted at these schools.

One school (8%) was not able to continue with the programme owing to large classes, which subsequently impacted on contact time. Problems were also experienced with storage of toothbrushes and cups to rinse owing to only one basin and tap being available. Educators therefore sent the toothbrushes and toothpaste home for learners to use; however, this created challenges as some learners did not use them at home or lost them. Three (23%) schools conducted the programme twice a week and one (8%) thrice a week. Daily toothbrushing was conducted by 8 (61%) schools, although they did highlight time constraints and lack of resources as a problem. It was alarming to note that learners at 12 (92%) schools did not have toothbrushes and paste to brush their teeth at home.

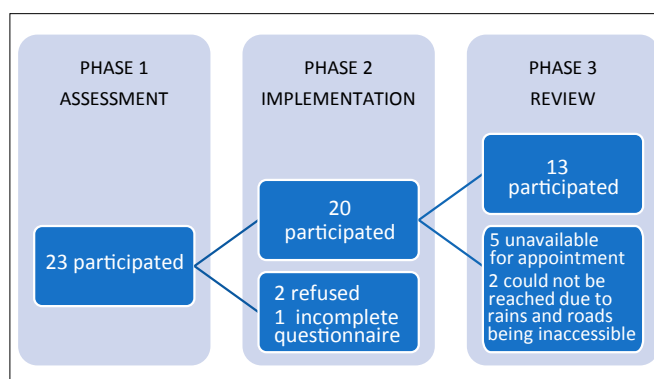


Fig. 1. Details of school participation in phases 1, 2 and 3.

Table 1. Caries experience and treatment needs of primary teeth of 6-year-olds in KwaZulu-Natal

	Percentage (%)
Caries experience/incidence	73
Needs	
Preventive/caries arresting	90
Surface fillings	35
Extractions	5

Table 2. Frequency of toothbrushing programmes per week

Number of schools (N=13)	Frequency
1	0
3	2 times/week
1	3 times/week
8	Daily

Table 3. Awareness of oral health

Focus group response (%) (N=13)	Target population
100	Learners
23	Educators
23	Parents

Three salient themes, namely awareness, support for interventions and resources, emanated from the data. The benefits and challenges are embedded in the identified themes for reporting.

Awareness

Awareness of oral health as reported in focus group discussions is illustrated in Table 3. Study findings indicated that the importance of oral health awareness was created for learners, educators and parents. Responses from all (100%) focus group participants emphasised that the impact of the interventions had created awareness of oral health for their learners:

- ‘Learners now know the importance of brushing their teeth.’
- ‘There is great improvement in learners’ oral hygiene.’

Participants at 3 (23%) schools further indicated that this programme had created awareness of oral health for educators:

- ‘It was beneficial to educators – an eye opener – they are now aware of the importance of oral health.’

Furthermore, parent awareness had been created at 3 (23%) schools by learners who asked their parents why they did not brush their teeth at home. Learners had also become increasingly aware of eating correctly at 2 (15%) schools by being particular about what they ate and correcting friends eating unhealthy foods or lunches. One participant attributed this marked improvement to awareness created by the programme:

‘A learner, offered a sweet at her dentist, refused knowing this was not good for her teeth.’

Participants at 4 (31%) schools indicated that appropriate awareness of the correct brushing technique was created:

‘Learners not familiar with the toothbrushing routine learnt how to brush their teeth.’

Responses further indicated learners’ awareness of the importance of brushing their teeth twice a day.

Challenges and limitations

Challenges and limitations experienced with the intervention are illustrated in Table 4.

Responses from 3 (23%) schools indicated that learners chewed their toothbrushes and ate toothpaste, resulting in depleted supplies which impacted on the programme. Replacing supplies was unaffordable as parents depended largely on social grants for income. The majority (70%) of school participants identified time constraints as a limitation to the intervention:

‘Only what is relevant to the curriculum is done due to time constraints. It’s impossible to manage large numbers of learners for oral health promotion activities.’

One participant (8%) also specified that low staff numbers resulted in higher workloads. Seemingly, participants at 2 (15%) schools managed:

‘Coped with time – procedure took five minutes.’

Support for interventions

Support for interventions is illustrated in Table 5. Study findings indicated that participants at 5 schools (39%) had some support for oral health interventions, while 7 (54%) had none. Support for interventions received from Colgate World of Care and the provincial Department of Health was not continuous and was dependent upon the availability of supplies:

‘Oral health personnel only visit the school when supplies are available.’

‘Colgate World of Care visits once a year.’

However, one quintile 1 school had support:

‘Nurses come almost every week and advise children. Colgate gives support.’

All (100%) participants indicated that the programme was discontinued once supplies were depleted as there was no budget for oral health from the provincial Department of Basic Education. Although educators recommended the purchasing of supplies by parents, this did not occur owing to affordability. The toothbrushing programme had to be discontinued once supplies were depleted.

Resources

Challenges faced in terms of resources are shown in Table 6.

All schools (100%) identified resource availability as a challenge to programme success. Participants at 5 (38%) schools highlighted water access as a major barrier to the implementation and success of the intervention:

‘Toothbrushing at school is difficult because there is no running water.’

Evidence of water shortages in the Sisonke District was brought to the researchers’ attention by educators who conveyed that children walked 5 km daily to fetch water from the river when there was no rain, resulting in learners missing valuable contact time. Participants also indicated a lack of basins and cups for rinsing:

‘There are insufficient cups for rinsing and only one basin to forty learners.’

Learners consequently left the space untidy. This had to be cleaned, resulting in time wastage. Another key challenge for the programme was the hygienic storage of toothbrushes and toothpaste supplies. This challenge was reported by all participants. Sponsorships for supplies could not be secured, resulting in programme discontinuation:

‘There are no sponsors to replace depleted supplies.’

Hygienic toothbrush storage was a challenge, especially in larger classes. Furthermore, labelling and distribution of toothbrushes was time consuming.

Discussion

Interventions in the school setting have been identified as the most creative and cost-effective way for improvement of health, oral health and, in turn, quality of life.^[23] Integrated, school-based preventive and promotive oral health programmes are prioritised in KwaZulu-Natal.^[11] However, there is a paucity of information on their implementation and effectiveness. Study findings indicated that the toothbrushing programmes were not implemented regularly. Therefore, knowledge gained from this study could inform future school-based preventive programmes. Although benefits were identified, many challenges affected the sustainability of this intervention.

The effectiveness of brushing daily with fluoride toothpaste is supported and reinforced by clinical trials.^[24,25] Additionally, schools are often used as a platform for supervised toothbrushing

Table 4. Challenges and limitations

Focus group response (%) (N=13)	Challenge/limitation
23	Learners chew toothbrush/eat toothpaste
70	Time constraints
8	Low staff numbers/higher workloads

Table 5. Support for interventions

Focus group response (%) (N=13)	Support
39	Some support
54	No support
8	Support
100	No support – budget

Table 6. Challenges for resources

Focus group response (%) (N=13)	Challenge/barrier
100	Resource availability
38	Water access
100	Toothbrush and toothpaste supplies
100	Toothbrush storage

programmes.^[26] It is evident from this study that awareness of the importance of daily brushing had been created for learners, educators and parents, especially those from rural areas. Moreover, the programme successfully inculcated correct brushing techniques. It was further noted that the majority of learners did not brush at home because they did not have toothbrushes or toothpaste. This is supported by the high (73%) caries incidence noted in phase 1. Interview responses suggested that this could be due to affordability, as many parents were poor, unemployed or dependent on social grants. The study findings support WHO recommendations for oral health promotion through schools.^[27] Saied-Moallemi *et al.*^[28] also argued for parental awareness of interventions at schools. Evidently, educators also benefited from this programme through self-reflection.

The intervention further highlighted the importance of correct eating habits, thus ensuring informed choices about lunches and tuck shop and vendor purchases by learners. These findings demonstrate the modification of oral health risk behaviours in learners through oral health promotion. Similar findings were noted in Tanzania.^[29]

Although some success was reported, educators faced many challenges with programme implementation. The majority of schools encountered time constraints. Educators found the programme time consuming especially with larger classes. Staff shortages, resulting in higher workloads, and a demanding curriculum further impacted on the programme. Additional activities undoubtedly added to existing workloads.^[30] Evidently, however, some participants coped. The researcher observed that programme success was dependent upon educators' commitment. Similar observations were noted in school-based brushing programmes in southern Thailand.^[31] The study findings indicated that the majority of schools received no or intermittent support for oral health promotion interventions. Although investigations revealed partnerships between Colgate World of Care, the Department of Basic Education and the Department of Health, only one mobile unit was operational in KwaZulu-Natal. Supplies distributed by school health nurses were inconsistent and not delivered to all districts. Numerous schools were unaware of toothbrush and toothpaste supplies offered by Colgate World of Care and the Department of Health. Hence, it can be assumed that supplies in districts are largely dependent upon staff and resource availability, and initiatives undertaken by school health nurses and oral health personnel in their respective districts.

Availability of funding for programme sustainability is imperative.^[29] Although SA has school-based oral health intervention strategies, implementation is dependent upon the availability of funding and materials for programme sustainability. Study findings indicated that the Department of Education did not have a dedicated budget for health and oral health promotion at schools. This was confirmed with baseline data from phase 1. These findings are further corroborated by Peterson and Kwan,^[29] who claimed that limited national budgets in countries worldwide impacted on the implementation of integrated health promotion. However, a recent global survey conducted by the WHO indicated that school-based oral health programmes were frequently subsidised by national and provincial governments.^[32] This was not evident in KwaZulu-Natal. Considering the prioritising of funding for the high burden of disease in KwaZulu-Natal, attempts should be made to secure funding outside the public sector in SA.^[33] Moreover, with financial constraints, the focus on effective evidence-based interventions is imperative. This can be achieved by incorporating oral health into general health to ensure positive gains from invested resources.^[32]

Reviews of the context of school oral health service delivery in KwaZulu-Natal depict an inequity in resource allocations. All schools in this study identified challenges with securing resources for their programmes. Proper access to water, required for the toothbrushing programme, posed an obstacle for some schools, as water availability

continues to be a challenge, especially in Umkhanyakude, Sisonke and Umzinyati districts.^[34]

Study findings indicated that educators had difficulty storing toothbrushes hygienically and complained about the lack of proper cups and basins for rinsing. Labelling and distributing toothbrushes was time consuming, thereby impacting on teaching time. For a successful programme, careful thought must be given to providing adequate resources to address these problems to ensure educators' willingness to conduct programmes.

This study has demonstrated that school-based interventions could have a positive impact on oral health for learners and communities by providing an opportunity for a holistic approach to healthy lifestyles and environments.^[32] The literature suggests that school-based toothbrushing programmes have made a positive impact on children's oral health.^[13] This is evident in a study conducted in Scotland where long-term outcome data obtained over 2 years demonstrated a positive effect on learners by showing a decrease in the prevalence of caries.^[35]

Conclusions

The results of this study suggest that the school setting has the potential to deliver integrated, preventive and promotive oral healthcare programmes. The interventions implemented in this study created awareness of oral health for learners, educators and parents in the short term. Evidence for the benefits of toothbrushing programmes is indisputable. To ensure long-term positive impacts on the oral health of communities in KwaZulu-Natal, factors affecting implementation in schools with limited resources warrant careful consideration.

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