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The delivery of oral health messages by primary health care nurses

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Abstract

Background and Objectives: New Zealand's 2006 'Strategic Vision for Oral Health' prioritises improving oral health for pre-schoolers. General practice nurses in New Zealand are well-placed in the community to provide oral health advice to caregivers of pre-schoolers who may not be receiving dental care. This survey aimed to obtain information on what oral health advice practice nurses already offer caregivers of young children, whether they believed this was part of their role, and what the barriers were to providing this advice.

Methods: A postal questionnaire was sent to 316 Otago and Southland nurses who identified as general practice nurses on the New Zealand Nurses' Organisation register.

Results: The majority of respondents were female (99.1%), New Zealand-qualified (87.7%), and aged over 41 years (74.8%). Some 48.7% had worked for 11 years or more as practice nurses. While some practice nurses offered advice on diet or enrolling children for dental care, they were less likely to offer advice on specific oral health topics, and the majority (72.8%) were not aware of the 'Lift the Lip' caries detection technique. Inadequate training was considered the main barrier to offering oral health advice by 74.1% of respondents.

Conclusion: Some general practice nurses in Otago and Southland already offered oral health advice to caregivers of young children. The majority would be willing to do so provided they had appropriate training and resources. Practice nurses could play a valuable role in improving the oral health of New Zealand pre-schoolers by offering oral health anticipatory guidance to their caregivers.

Introduction

The Strategic Vision for Oral Health in New Zealand, 'Good Oral Health for All, for Life' (2006), has emphasised improving pre-school oral health as a priority (New Zealand Ministry of Health 2006). The New Zealand Ministry of Health routinely collects dmft (decayed, missing, filled deciduous teeth) data and caries-free data for 5-year-old children; this gives an indication of their pre-school oral health status. In 2013, the average dmft for 5-year-old children was 1.88 and 57.46% of children were caries-free.[1] While the statistics show some improvement in oral health for five-year-olds in recent years,[2] there are still significant inequalities in oral health between groups of New Zealand children. Māori five-year-olds had an average dmft of 3.12 and only 37.37% were caries-free, while Pacific Island five-year-olds had an average dmft of 3.23 and only 36.29% were caries free. Five-year-olds living in fluoridated areas in 2013 had a lower average dmft (1.72) than those living in non-fluoridated areas (2.05), and children living in lower socioeconomic areas also experience more caries.[3] Furthermore, early childhood caries (ECC) is still a significant global health problem for pre-schoolers and can lead to extensive caries, pain, and abscessed teeth (Gussy et al. 2006a; New Zealand Ministry of Health 2008; Oral Health Research Group 2008; Kilpatrick 2010; Leong et al. 2013). Receiving appropriate oral health advice at an early age is important for good oral health; however, enrolment for pre-school dental care in New Zealand is not high. Approximately 60% of preschool children were enrolled for care in 2010 as compared to 98% of primary school children and 68% of secondary school children.[4]

The 'New Zealand Health Strategy's District Health Board (DHB) 'Oral Health Toolkit' (2004) recommended that Māori, Pacific Island, new migrant children and children from low socio-economic areas be enrolled for dental care before the age of one year, while those in other groups should be enrolled before the age of three (New Zealand Ministry of Health 2004). Although some DHB School/Community Oral Health Services in New Zealand were already enrolling children from six months of age, this did not necessarily mean that children and infants attended for dental visits at this early age. 'Good Oral Health for All, for Life' recommended that oral health activities start at birth (New Zealand Ministry of Health 2006), and the international literature gives evidence that a dental visit before the age of one year improves oral health outcomes for children (Rayner et al. 2003; Widmer 2003; Savage et al. 2004; Gussy et al. 2006a; New Zealand Ministry of Health 2008; Scottish Dental Clinical

1 Age 5 and Year 8 oral health data from the Community Oral Health Service. http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/oral-health-data-and-stats/age-5-and-year-8-oral-health-data-community-oral-health-service

2 New Zealand Ministry of Health Age 5 and Year 8 time-series oral health data. http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/oral-health-data-and-stats/age-5-and-year-8-time-series-oral-health-data

3 Age 5 and Year 8 oral health data from the Community Oral Health Service. http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/oral-health-data-and-stats/age-5-and-year-8-oral-health-data-community-oral-health-service

4 Personal communication with Guan Lye Chua, Oral Health Advisor, Ministry of Health, 2012.

Effectiveness Programme 2010; AAPD Clinical Affairs Committee 2013; New Zealand Ministry of Health 2013; AAPD Clinical Affairs Committee 2014; AAPD Council on Clinical Affairs 2015).

The literature also indicates that young children are more likely to be seen by a general medical practitioner or nurse than by oral health professionals during their early years, and that primary healthcare providers can play an important role in providing oral health information and referrals for young children and their caregivers (dela Cruz et al. 2004; New Zealand Ministry of Health 2006; Gussy et al. 2006b; Oral Health Research Group 2008; Hallas and Shelley 2009; Kilpatrick 2010; Peterson-Sweeney and Stevens 2010; Hallas et al. 2011; Neumann et al. 2011; Kolisa 2016; Loken et al. 2016). However, oral health and general health are often perceived as separate, and some providers did not consider offering oral health advice as a priority or a part of their role (Kilpatrick 2010; Peterson-Sweeney and Stevens 2010), while others needed relevant oral health knowledge and appropriate training in order to deliver confidently oral health advice to caregivers of young children (dela Cruz et al. 2004; Gussy et al. 2006b; Hallas and Shelley 2009; Kilpatrick 2010; Peterson-Sweeney and Stevens 2010; Rabiei et al. 2014).

New Zealand's strategy for oral health encourages links with providers of primary care. 'Well Child' providers, general practice nurses, Plunket nurses,[5] and Māori and Pacific Providers who have contact with caregivers and infants can provide anticipatory guidance in regards to oral health (New Zealand Ministry of Health 2006). 'Well Child' providers, such as Plunket, encourage enrolment of children with the School/Community Oral Health Service by nine months of age and have reminders in the 'Well Child' booklet to do so (HealthEd 2015). Plunket has collaborated with Colgate and the New Zealand Dental Association (from 2007) to provide oral health advice and toothbrushes and toothpaste to children at five months of age.[6] Often those who are most at risk for caries, however, are intermittent or infrequent users of primary health services (New Zealand Ministry of Health 2008). A broader approach is required to ensure all children are receiving the care and advice they need. Involving general practice nurses in providing oral health advice to caregivers and enrolling children for oral health care when they have contact with children may prove an effective method of further increasing preschool enrolment rates and reducing caries rates (New Zealand Ministry of Health 2008). The core messages for caregivers that are most likely to improve oral health outcomes in young children, and could be given by primary care providers, are clearly defined and centre on diet, tooth-brushing with fluoride toothpaste, and regular visits to an oral health professional (Tinanoff et al. 2002; Gussy et al. 2006a; Scottish Dental Clinical Effectiveness Programme 2010; AAPD Clinical Affairs Committee 2014). Teaching primary care providers to 'Lift the Lip' and check for caries in infants and pre-schoolers is also recommended.[7]

This study surveyed general practice nurses in the Otago and Southland regions of New Zealand to determine whether they currently gave oral health advice to caregivers and whether they encouraged enrolment of young children with the School/Community Oral Health Services. It investigated how comfortable practice nurses felt giving oral health advice, what advice they were prepared to give or would like to offer, what training they had had in offering oral health advice, and whether they believed they required further training. The survey was administered prior to implementing an intervention whereby general practice nurses in three Dunedin general medical practices gave oral health advice to caregivers of babies receiving their five-month-old immunisations.

Methods

Ethics approval was obtained from the Southern Health and Disability Ethics Committee (LRS/10/02/004). The study sample comprised 316 general practice nurses from the New Zealand provinces of Otago and Southland who were identified as general practice nurses on the New Zealand Nurses' Organisation membership register. Questionnaires were mailed to the practice nurses in 2011, and respondents were entered into a random prize draw to encourage the return of questionnaires. A second mail-out of questionnaires took place later with the aim of increasing the response rate. Information was sought on the general characteristics of respondents, their current practice for giving oral health advice to caregivers of young children and what advice they were prepared to give, as well as their views on oral health information sharing. Responses were analysed using the Statistical Package for the Social Sciences (version 17.0, IBM, USA). Associations between categorical variables were tested for statistical significance using the Chi-Square test with the alpha level set at 0.05 and 0.01. PRISM software (Version 6.0, GraphPad, USA) was used for presentation of the graphs.

Results

The response rate for this survey was 45.1%, with a total of 116 general practice nurses returning surveys; of these 93 were returned in the first mail-out. The majority of respondents were female (99.1%). A quarter of respondents (25.2%) were aged 20 - 40 years, 64% were aged 41 - 60 years, while the remainder (10.8%) were over 61 years of age. Approximately half (51.3%) had spent up to 10 years working as a practice nurse, while 48.7% had worked for 11 years or more as a practice nurse. The majority were New Zealand-trained (87.7%).

Practice nurses were asked what type of oral health advice they gave to caregivers of preschool children and whether advice was given 'often', 'sometimes' or 'never' (Figure 1). The advice most likely to be given to caregivers was advice on the child's diet, with 44.2% of practice nurses 'often' giving advice and 48.7% 'sometimes'

5 'New Zealand's largest provider of support services for the development, health and wellbeing of children under 5.' For more information see: http://www.plunket.org.nz/

6 Royal New Zealand Plunket Society Incorporated. Plunket. Colgate. http://www.plunket.org.nz/help-us-today/your-business-and-plunket/our-sponsors-and-business-partners/colgate/

7 New Zealand Dental Association. Healthy Smiles. Lift the Lip. http://www.healthysmiles.org.nz/default,120,lift-the-lip-.sm

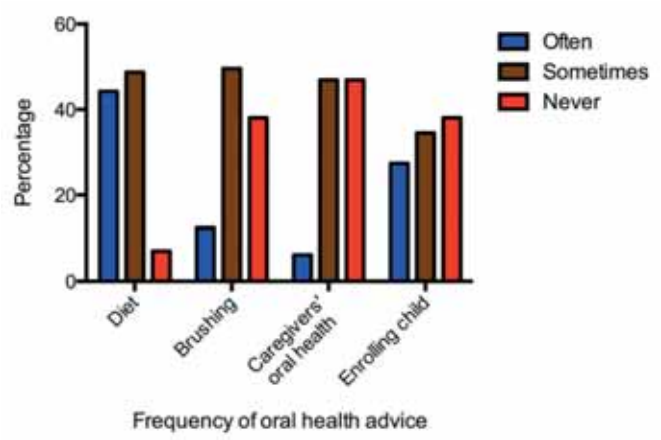

Figure 1. Oral health advice given to caregivers of pre-school children

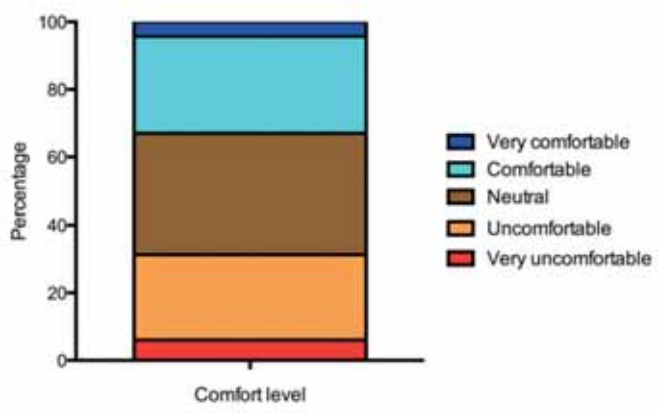

Figure 2. Practice nurses' comfort level in giving oral health information

giving advice. Older practice nurses (aged 41+ years, as compared to those aged 20 - 40 years) were more likely to give oral health advice (Pearson Chi-Squared; p=0.017). The more years s/he had spent in practice (0 - 10 years, as compared to 11+ years), the more likely s/he was to give advice on diet (Pearson Chi-Squared; p=0.009). About half of the respondents 'sometimes' gave advice on brushing the child's teeth or the caregivers' own oral health; however, almost as many 'never' gave advice on these topics.

Approximately two-thirds (61.9%) of the practice nurses 'often' or 'sometimes' gave information about enrolling with the School/Community Oral Health Services. The longer a practice nurse had been in practice, the more likely s/he was to do so (Pearson Chi-Squared; p=0.026). Approximately half (51.8%) of the practice nurses thought they themselves should be (administratively) enrolling children in the School/Community Oral Health Services, while 6.4% thought that 'maybe' they should. The majority of respondents (81.6%) indicated that it would be acceptable for them to help a parent/caregiver enrol their child with the School/Community Oral Health Services, while 11.4% were 'neutral' and 7.0% considered this 'unacceptable'. The practice nurses were asked whether their practice had School/Community Oral Health Services enrolment forms available on site. The majority (67.5%) of practice nurses answered no, 26.3% answered yes, and 6.1% of respondents did not know.

'Lift the Lip' is a technique whereby health practitioners literally lift the upper lip of a baby or child to look for the early signs of dental caries. Almost three-quarters (72.8%) of practice nurses did not know what this technique was; however, a small percentage (11.4%) of nurses indicated that they had used 'Lift the Lip' in their practice. Practice nurses were asked how acceptable they would find it to look in a child's mouth for signs of tooth decay if they were trained to do so. Some 68.7% responded that this would be acceptable while 18.3% were neutral. Even if trained, 13.0% would still find this unacceptable.

A third (33%) of the practice nurses felt either 'comfortable' or 'very comfortable' in giving oral health advice to parents/caregivers of preschool children. However, the majority were either 'neutral', 'uncomfortable', or 'very uncomfortable' (Figure 2). About two-thirds (65.5%) of practice nurses thought training in giving oral health advice would be helpful and 94.8% of respondents would feel comfortable giving oral health advice once trained. Only 12.2% of respondents believed they had been 'very well-trained' or 'adequately trained' to give oral health advice to parents, while most felt their training was either 'limited' or they had received no training at all (Figure 3). Inadequate training was actually perceived as being the main barrier to practice nurses giving oral health advice (74.1%), while lack of information (59.5%) and time constraints (49.1%) were also barriers. The longer a practice nurse had been in practice (0 - 10 years, as compared to 11+ years), the more likely s/he was to say that lack of information was an issue (Fisher's Exact; p=0.034). A tenth (10.3%) of respondents believed that giving oral health advice was not part of the practice nurse's role.

Practice nurses were asked what kind of oral health advice they would like to give to parents. Diet was the most popular (94.0%), followed by tooth-brushing with fluoride toothpaste (87.9%), and enrolling the child with the School/Community Oral Health Services (78.4%). Practice nurses were also interested in giving advice to caregivers on their oral health (59.5%). The majority (72.5%) indicated that two hours training in oral health advice and 'Lift the Lip' would be enough to help them feel competent in providing oral health advice; however, 8.3% felt that they would never feel competent no matter how much training was given.

Discussion

General practice nurses in the New Zealand provinces of Otago and Southland were surveyed about their practice and views on offering oral health advice to caregivers of preschool children. Practice nurses gave some oral health advice already, particularly when it came to diet, and some advised caregivers to enrol their child for dental care. The majority of practice nurses were not familiar with the 'Lift the Lip' technique of checking for early signs of caries but most would feel comfortable learning the technique; two-thirds found it acceptable to look in a child's mouth for decay. Most practice nurses did not feel comfortable delivering oral health advice, with inadequate training being the main barrier to doing so. However, almost all practice nurses would feel competent giving oral health advice once they had the appropriate training.

There were difficulties identifying which nurses were

currently actively working within general practice clinics using the New Zealand Nurses' Organisation membership register, thus leading to a lower response rate. The use of an alternative data source through the Nursing Council of New Zealand register could not be used; while nurses register in scopes of practice, 'practice areas' were not identified. However, the Council collects workforce data each year and active registered nurses are identified by 'practice area' in the Council's workforce reports for some demographic information. The respondents in this survey are representative of the wider New Zealand active registered practice nurse population in terms of gender, age, and qualification (Te Kaunihera Tapui o Aotearoa. Nursing Council of New Zealand 2010).

The international literature supports the role of primary health providers in offering oral health anticipatory guidance and information to the caregivers of babies and young children (dela Cruz et al. 2004; New Zealand Ministry of Health 2006; Gussy et al. 2006b; New Zealand Ministry of Health 2008; Hallas and Shelley 2009; Peterson-Sweeney and Stevens 2010; Hallas et al. 2011; Neumann et al. 2011; Kolisa 2016; Loken et al. 2016). In New Zealand, 'Well Child' providers offer support to all children from birth to five-years-of-age and their families, in order to maximise the child's health and development. Twelve health checks are provided, as well as additional services to first-time parents and families requiring support. Offering oral health advice is recommended as part of their role, as are screening for abnormalities (for example, dental caries) and ensuring enrolment with a dental provider by 12 months of age (New Zealand Ministry of Health 2013). While many children may already be visiting 'Well Child' providers, those most at risk for ECC may be intermittent or episodic users of these services (New Zealand Ministry of Health 2008). Some children may be more likely to visit a general medical practice; for example, New Zealand statistics on immunisation show that almost 95% of New Zealand children attend for immunisations by the age of one year.[8] Practice nurses may be well-placed to provide oral health advice and assistance with enrolment for dental care to those caregivers and children who may be missing out, and some nurses may already be doing so.

Diet was the most popular topic that the practice nurses in this study talked about to caregivers. The older a practice nurse was, or the more years s/he had spent in practice, the more likely s/he was to speak to discuss diet. It is possible that older or experienced nurses felt confident discussing diet because they had had more experience speaking to caregivers than other nurses. Diet is part of general health; these nurses may have had more knowledge to give on this topic, either from their education or from experience with their own children/grandchildren. The nurses were less likely to discuss oral health-related topics such as tooth-brushing, caregivers' oral health, and enrolling the children with the School/Community Oral Health Services. This suggests that they may have lacked specific oral health training and knowledge.

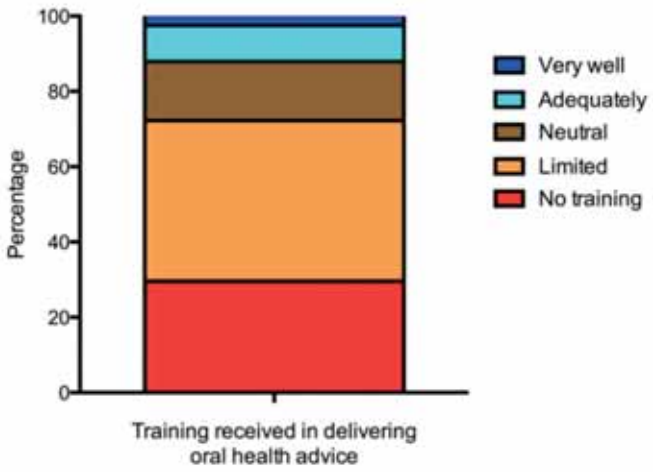

Figure 3. Were practice nurses adequately trained to give oral health advice?

In fact, when asked, most practice nurses indicated that inadequate training was the main barrier to giving oral health advice, followed by lack of knowledge. Furthermore, over 70% of practice nurses were not aware of the 'Lift the Lip' technique of assessing children for the early signs of caries, despite the fact that this technique is recommended by the Ministry of Health for 'Well Child' providers to detect early signs of dental caries (New Zealand Ministry of Health 2008), and is also recommended by oral health professionals for use by caregivers. This indicates that oral health is not a priority in the nursing curriculum or a topic for continuing professional development courses for practice nurses. One reason for this is that the public and the medical and dental professions perceive oral health as being separate from general health in both the education and health delivery systems. Undergraduate medical curricula rarely include oral health content even though oral health conditions can be symptoms of other systemic diseases or can lead to poor general health (Kilpatrick 2010; Peterson-Sweeney and Stevens 2010; Skeie et al. 2011; Rabiei et al. 2014). Where oral health is included in curricula, for example, for American Pediatric Nurse Practitioners, there are gaps in postgraduate training and there is very little data on whether the recommended oral health curricula are actually being implemented (Hallas and Shelley 2009). Furthermore, there may be very few continuing professional development (CPD) courses on oral health for primary health providers (Peterson-Sweeney and Stevens 2010).

The majority of practice nurses in this study either felt 'neutral' or 'not comfortable' giving oral health advice to the parents of preschool children. In Australia, non-dental healthcare providers, such as maternal and child health nurses, also did not feel comfortable giving oral health advice; confidence and self-perceived legitimacy to assume this role were issues. Where oral health advice was part of the role of primary health provider, it was often not considered a priority amongst other health messages (Skeie et al. 2011). Research also highlighted gaps in the oral health knowledge of primary health providers and advocated training and education (Gussy et al. 2006b;

8 New Zealand Ministry of Health National and DHB immunisation data. http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/immunisation-coverage/national-and-dhb-immunisation-data

Hallas and Shelley 2009; Kilpatrick 2010; Peterson-Sweeney and Stevens 2010; Skeie et al. 2011; Arora et al. 2012; de Oliveira Diniz et al. 2012; Rabiei et al. 2014; Kolisa 2016).

On a positive note, almost 95% of nurses indicated that they would feel competent giving oral health advice if they had training, and 90% of the nurses would feel comfortable learning the 'Lift the Lip' technique. Any oral health advice given needs to be consistent between health providers, evidence-based and appropriate (Gussy et al. 2006b); one way of achieving this is to provide multidisciplinary CPD or postgraduate courses which promote teamwork (de Oliveira Diniz et al. 2012; Rabiei et al. 2014). Furthermore, efforts to increase providers' oral health knowledge need to be combined with efforts to increase provider confidence (dela Cruz et al. 2004; Rabiei et al. 2014).

The older or more experienced practice nurses were more likely to suggest enrolling a child with the School/Community Oral Health Services. This is consistent with the findings of a Norwegian study which noted that health nurses aged 45 years and older were more likely to know about dental referrals than younger nurses, possibly due to knowledge and professional skills accumulated by age (Loken et al. 2016). In New Zealand, older nurses may have gained knowledge of the School Dental Service over their years of practice or from having their own children/grandchildren attend a school dental clinic. While just under a third of practice nurses did not advise caregivers to enrol for dental care, it was encouraging to note that over 80% believed that it would be acceptable to do so.

The literature recommends a dental visit before the age of one year to provide anticipatory guidance for caregivers and for the prevention of ECC in young children (Rayner et al. 2003; Widmer 2003; Savage et al. 2004; Gussy et al. 2006a; New Zealand Ministry of Health 2008; Scottish Dental Clinical Effectiveness Programme 2010; AAPD Clinical Affairs Committee 2013; New Zealand Ministry of Health 2013; AAPD Clinical Affairs Committee 2014; AAPD Council on Clinical Affairs 2015). 'Well Child' recommend that their providers facilitate referral of children to the dental therapist by the age of one year (New Zealand Ministry of Health 2013). Practice nurses could provide a 'safety net' for those children who miss enrolling. dela Cruz et al. (2004) found that the most common method of referral for medical providers in their study was to give the name of a dentist to the caregiver. However, this did not aid in negotiating barriers to dental care, particularly for low-income families (dela Cruz et al. 2004). The practice nurses in our study indicated that they were prepared to ensure enrolment forms were filled in at the practice. However, the majority did not have access to enrolment forms on site. School/Community Oral Health Services could ensure that General Medical practices in their areas have access to enrolment forms and arrange collection of completed forms.

Conclusion

The general practice nurses in this study were very willing to offer oral health advice and information to caregivers of young children provided they had the appropriate training and education. Providers offering oral health and general health services for babies and pre-schoolers should consider including general practice nurses in programmes designed to promote and improve oral health for this group. General practice nurses could provide a 'safety net' for those at-risk children who may not be seen by other providers or could positively reinforce oral health messages given by other providers.

References

AAPD Clinical Affairs Committee (2013). Clinical Practice Guidelines. Guideline on Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance/Counseling, and Oral Treatment for Infants, Children, and Adolescents. *American Academy of Pediatric Dentistry Reference Manual.* [accessed 2 May 2016]; 37(6)*:*123-130. http://www.aapd.org/media/Policies_Guidelines/G_Periodicity.pdf

AAPD Clinical Affairs Committee (2014). Clinical Practice Guidelines. Guideline on Infant Oral Health Care. *American Academy of Pediatric Dentistry Reference Manual.* [accessed 2 May 2016]; 37(6)*:*146-150. http://www.aapd.org/media/Policies_Guidelines/G_InfantOralHealthCare.pdf

AAPD Council on Clinical Affairs (2015). Policy on the Dental Home. *American Academy of Pediatric Dentistry Reference Manual.* [accessed 2 May 2016]; 37(6)*:*24-25. http://www.aapd.org/media/Policies_Guidelines/D_DentalHome.pdf

Arora A, Bedros D, Bhole S, Do LG, Scott J, Blinkhorn A *et al.* (2012). Child and family health nurses' experiences of oral health of preschool children: a qualitative approach. *J Public Health Dent* 72(2):149-155.

de Oliveira Diniz LV, da Costa CHM, Oliveira AFB, Forte FDS (2012). Health professionals' knowledge of oral health preventive practices regarding early childhood health care. *J Public Health* 20:513-518.

dela Cruz GG, Rozier RG, Slade G (2004). Dental screening and referral of young children by pediatric primary care providers. *Pediatrics* 114(5):e642-652.

Gussy MG, Waters EG, Walsh O, Kilpatrick NM (2006a). Early childhood caries: current evidence for aetiology and prevention. *J Paediatr Child Health* 42(1-2):37-43.

Gussy MG, Waters E, Kilpatrick NM (2006b). A qualitative study exploring barriers to a model of shared care for pre-school children's oral health. *Br Dent J* 201(3):165-170.

Hallas D, Shelley D (2009). Role of pediatric nurse practitioners in oral health care. *Acad Pediatr* 9(6):462-466.

Hallas D, Fernandez J, Lim L, Carobene M (2011). Nursing strategies to reduce the incidence of early childhood caries in culturally diverse populations. *J Pediatr Nurs* 26(3):248-256.

HealthEd (2015). *Well Child Tamariki Ora. My Health Book.* [accessed 2 May 2016]. https://www.healthed.govt.nz/resource/well-childtamariki-ora-health-book.

Kilpatrick N (2010). They're only baby teeth; who should care? *Ann R Australas Coll Dent Surg* 20:42-44.

Kolisa Y (2016). Assessment of oral health promotion services offered as part of maternal and child health services in the Tshwane Health District, Pretoria, South Africa. *Afr J Prim Health Care Fam Med.* [accessed 2 November 2016]; 8(1)*:*1-8. http://doi.org/10.4102/phcfm.v8i1.794

Leong PM, Gussy MG, Barrow SY, de Silva-Sanigorski A, Waters E (2013). A systematic review of risk factors during first year of life for early childhood caries. *Int J Paediatr Dent* 23(4):235-250.

Loken SY, Wang NJ, Wigen TI (2016). Health nurses' experiences and attitudes regarding collaboration with dental personnel. *BMC Oral Health.* [accessed 2 November 2016]; 16(66):1-7. http://doi.org/10.1186/s12903-016-0226-8.

Neumann AS, Lee KJ, Gussy MG, Waters EB, Carlin JB, Riggs E *et al.* (2011). Impact of an oral health intervention on pre-school children <3 years of age in a rural setting in Australia. *J Paediatr Child Health* 47(6):367-372.

New Zealand Ministry of Health (2004). *New Zealand Health Strategy DHB Toolkit. Improve Oral Health*. 2 ed. Wellington: Ministry of Health.

New Zealand Ministry of Health (2006). *Good oral health for all, for life: the strategic vision for oral health in New Zealand.* Wellington: Ministry of Health.

New Zealand Ministry of Health (2008). *Early Childhood Oral Health: A toolkit for District Health Boards, primary health care and public health providers and for oral health services relating to infant and preschool oral health.* Wellington: Ministry of Health.

New Zealand Ministry of Health (2013). *Well Child/Tamariki Ora Programme Practitioner Handbook. Supporting families and wh nau to promote their child's health and development.* Wellington: Ministry of Health; [accessed 2 May 2015]. http://www.health.govt.nz/publication/well-child-tamariki-ora-programme-practitioner-handbook-2013.

Oral Health Research Group MCsRI (2008). *Maternal and Child Oral Health - Systematic Review and Analysis. A report for the New Zealand Ministry of Health.* [accessed 2 May 2016]. http://www.health.govt.nz/publication/maternal-and-child-oral-health-systematic-review-and-analysis.

Peterson-Sweeney K, Stevens J (2010). Optimizing the health of infants and children: their oral health counts! *J Pediatr Nurs* 25(4):244-249.

Rabiei S, Mohebbi SZ, Yazdani R, Virtanen JI (2014). Primary care nurses' awareness of and willingness to perform children's oral health care. *BMC Oral Health.* [accessed 2 November 2016]; 14(26):1-9. http://doi.org/10.1186/1472-6831-14-26.

Rayner J, Holt R, Blinkhorn F, Duncan K (2003). British Society of Paediatric Dentistry: a policy document on oral health care in preschool children. *Int J Paediatr Dent* 13:279-285.

Savage MF, Lee JY, Kotch JB, Vann Jr. WF (2004). Early Preventive Dental Visits: Effects on Subsequent Utilization and Costs. *Pediatrics* 114(4):418-423.

Scottish Dental Clinical Effectiveness Programme (2010). *Prevention and Management of Dental Caries in Children. Dental Clinical Guidance.* Dundee Dental Education Centre.

Skeie MS, Skaret E, Espelid I, Misvaer N (2011). Do public health nurses in Norway promote information on oral health? *BMC Oral Health* 11(23):1-9.

Te Kaunihera Tapui o Aotearoa. Nursing Council of New Zealand (2010). *The New Zealand Nursing Workforce. A Profile of Nurse Practitioners, Registered Nurses, Nurse Assistants and Enrolled Nurses 2010.* [accessed 14 February 2017]. http://www.nursingcouncil.org.nz/Publications/Reports-and-workforce-statistics.

Tinanoff N, Kanellis MJ, Vargas CM (2002). Current understanding of the epidemiology mechanisms, and prevention of dental caries in preschool children. *Pediatr Dent* 24(6):543-551.

Widmer R (2003). The first dental visit: an Australian perspective. *Int J Paediatr Dent* 13:270.

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