**ABSTRACT**

**Objectives:** The primary objective was to clearly assess the oral health care knowledge of Southland parents. The secondary objective was to identify whether inequalities exist between parents with different ethnicity, education or income.

**Design:** An exploratory study based on a simple online/paper questionnaire.

**Setting:** Participants were recruited through Southland early childcare centres. Researchers contacted 115 centres, 66 agreed to participate and 58 returned questionnaires.

**Methods:** Questionnaires were distributed to each centre to be completed by the parents. The questionnaire was able to be completed online or as a paper copy. Centres were supplied with dental brochures, which were distributed after the questionnaires were returned. Questionnaires were collated and the responses analysed.

**Results:** Six hundred and seventy questionnaires were returned, 213 online and 457 paper copies. The typical participant was a mother (93.9%), age 34 years (median), a non-smoker (86.3%), non-Maori (87.1%), with a university degree (33.9%) and an annual household income between $60,001 and $100,000 (36.5%). Twenty of the 47 questions were selected to reflect parental knowledge. Overall, 65.1% of the respondents answered all 20 questions correctly. Differences in knowledge were identified between mothers and other participants (65.4% vs. 59.4%), smokers and non-smokers (61.3% vs. 65.7%), Maori and non-Maori (61.6% vs. 65.6%) and education level (Primary 58.0% vs. Degree 68.7%) (P<0.05).

**Conclusions:** This study revealed differences in knowledge in early childhood oral health care. Participants who identified as non-mothers (fathers, step-fathers, legal care givers or other), smokers, Maori or low education displayed significantly less knowledge. Further education and oral health care promotion may be needed to improve this disparity.

INTRODUCTION

Poor oral health has negative impacts on general health and quality of life; dental caries remains the most prevalent chronic (irreversible) disease in the country (Ministry of Health, 2010a). Adults are able to make their own dental decisions but young children are totally reliant on their parents or caregivers to make these decisions for them (Mattheus, 2010). Children under the age of five years old generally spend the majority of their time with their parents, especially their mothers, even when they attend nurseries or early childcare centres (Suresh et al, 2010). The health behaviour and outcomes of these children are directly influenced by their parent’s knowledge and beliefs. Without basic knowledge of oral health, it is hard to employ effective disease prevention strategies (Finlayson et al, 2007).

Many people perceive dentistry as unaffordable or even as an optional extra for those that can afford it (Johansson and Fridlund, 1996; Land, 2000; Fitzgerald et al, 2004; Ministry of Health, 2010a). Cost has been identified as a key barrier limiting access to dental care. Other factors that have been identified to be associated with poor oral health include parental income, education, ethnicity, sociodemographic characteristics, maternal age, the infants diet, and populations living in rural and non-fluoridated areas (Harrison et al, 1997; Jamieson and Koopu, 2006; Jamieson and Koopu, 2007; Abiola Adeniyi et al, 2009; Parker et al, 2010; Neumann et al, 2011; Wong et al, 2011). In fact, a review of the literature by Harris and colleagues (2004) identified 106 risk factors that were significantly related to the prevalence or incidence of caries.

The purpose of this study was to assess and document the oral health care knowledge of Southland parents who have children in early childcare centres. The secondary objective was to identify whether there were sociodemographic differences in knowledge of oral health.

METHODS

The researchers contacted 115 kindergartens, playcentres, playgroups, home based childcare businesses, Te Kōhanga Reo and early childcare centres in Southland. New Zealand’s southern most region has a population of approximately 94,900 (Statistics New Zealand, 2012a) and covers an area of 34,347 km².

The questionnaire was designed around information available in the Ministry of Health (2009a) booklet “It’s easy to protect your family’s smile” and the Ministry of Health (2010a) report “Our Oral Health: Key findings of the 2009 New Zealand Oral Health Survey” along with the findings of a 2010 study by Macintosh and colleagues. The questionnaire was reviewed by an independent dentist and a manager from an early childcare centre before an online version was developed using the www.surveymonkey.com website. A small pilot study (16 participants) was conducted to ensure there were no technical issues. Ethical approval was given by the New Zealand Dental Journal – March 2015
A total of 641 questionnaires were completed in their entirety and suitable for statistical analysis.

The demographic characteristics of the participants are shown in Table 1.

Overall, 65.1% of the participants answered all 20 general dental knowledge and preventive dental knowledge questions correctly. An analysis of the socio-demographic sub-groups of this result is summarised in Table 2.

Ten of the questions were answered well with over 75% of participants choosing the correct answer. Five questions proved more difficult with between 50 and 74% of participants choosing the correct answer. Five questions were answered poorly, with less than 50% of the participants able to choose the correct answer. These questions are illustrated in Figure 2 and Figure 3.

DISCUSSION

This study questioned 670 parents on their knowledge of early childhood oral health care. Participants were recruited through Southland early childcare centres. The study identified significant sociodemographic differences in knowledge between mothers and non-mothers, smokers and non-smokers, Maori and non-Maori and education level.

Before discussing the findings, the study’s limitations need to be considered. The questionnaire was distributed only to sites and parents willing to participate. Social desirability influences participants to choose the answer they believe to be correct, rather than their actual practice. The incentive of the $100 draws may be considered controversial (Singer and...
Table 1. Demographic characteristics of the participants by education level. (Brackets contain row percentages unless otherwise indicated.)

<table>
<thead>
<tr>
<th>Highest Education Level Attained</th>
<th>All Combined</th>
<th>Primary (64 (10.0))</th>
<th>Secondary (167 (26.1))</th>
<th>Post-secondary (193 (30.1))</th>
<th>University (217 (33.9))</th>
<th>All Combined (641 (100.0))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
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<tr>
<td>Mother</td>
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<td>Other</td>
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<td>Age group</td>
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<td>Younger than 30</td>
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<td>30 to 34</td>
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<td>35 and over</td>
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<tr>
<td>Maori</td>
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<td>No</td>
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<td>Yes</td>
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<td></td>
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<tr>
<td>Smoker</td>
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<td>No</td>
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<td>Yes</td>
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<td>Annual household income</td>
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<td>$60,000 and under</td>
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<tr>
<td>$60,001–$100,000</td>
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<tr>
<td>Over $100,000</td>
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<tr>
<td>Did not answer</td>
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</tbody>
</table>

*P<0.05

Table 2. Mean percentage of correct responses by sociodemographic characteristics (brackets contain standard deviation).

<table>
<thead>
<tr>
<th>Prevention</th>
<th>Knowledge</th>
<th>Both combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Younger than 30</td>
<td>70.5 (18.9)</td>
<td>58.3 (18.2)</td>
</tr>
<tr>
<td>30 to 34</td>
<td>74.2 (15.7)</td>
<td>61.9 (17.1)</td>
</tr>
<tr>
<td>35 and over</td>
<td>73.8 (17.6)</td>
<td>59.2 (18.3)</td>
</tr>
<tr>
<td>Maori</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>74.1 (16.9)*</td>
<td>59.9 (17.9)</td>
</tr>
<tr>
<td>Yes</td>
<td>65.5 (19.6)</td>
<td>59.0 (18.4)</td>
</tr>
<tr>
<td>Highest education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>64.7 (19.1)*</td>
<td>53.6 (17.8)</td>
</tr>
<tr>
<td>Secondary</td>
<td>71.1 (19.2)</td>
<td>57.2 (17.6)</td>
</tr>
<tr>
<td>Post-secondary</td>
<td>72.2 (17.1)</td>
<td>60.7 (18.3)</td>
</tr>
<tr>
<td>Degree</td>
<td>77.7 (14.4)</td>
<td>62.7 (17.2)*</td>
</tr>
<tr>
<td>Smoker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>74.2 (16.8)*</td>
<td>60.0 (18.1)</td>
</tr>
<tr>
<td>Yes</td>
<td>65.8 (19.7)</td>
<td>58.2 (17.0)</td>
</tr>
<tr>
<td>Annual household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$60,000 and under</td>
<td>71.0 (19.7)*</td>
<td>58.8 (17.5)</td>
</tr>
<tr>
<td>$60,001 to $100,000</td>
<td>74.6 (15.4)</td>
<td>60.8 (18.9)</td>
</tr>
<tr>
<td>Over $100,000</td>
<td>77.1 (15.2)</td>
<td>60.2 (16.2)</td>
</tr>
<tr>
<td>All combined</td>
<td>73.0 (17.5)</td>
<td>58.0 (19.7)</td>
</tr>
</tbody>
</table>

*P<0.05
Couper 2008), however Grant and Sugarman (2004) state that a completion bonus for filling out a simple questionnaire poses no ethical problems.

The study sample appears to be consistent with those of the general population. The median age of respondents was 34 years. Given the median age of the children involved was 4 years 1 month, this is consistent with the age of mothers giving birth in New Zealand (Ministry of Health, 2009b). Southland’s population of 11.4% Maori is very close to the 12.9% Maori participants. The education level of the sample was higher (64.0%) than the general Southland population, where 32.2% of adults have a post-school qualification (Statistics New Zealand, 2013). It is feasible that mothers with higher levels of education are more attached to the labour force, have higher incomes and are more likely to have children in early childhood centres (Augustine et al, 2009). About one in seven of the sample were smokers whereas about one in five of the New Zealand population are smokers (Ministry of Health, 2010b).

The majority of the questions were answered well but five questions were answered poorly with a high number of incorrect answers or “I don’t know” responses (Figure 3). Macintosh and colleagues (2010) had similar results, with some questions answered poorly, and in over half of their questions the number of “I don’t know” responses ranged from 15% to 45%. They identified that after an education session with the same participants there was a reduction in the proportion of “I don’t know” answers.

In our study only 26% of participants were aware early childhood tooth decay could affect children as young as six months old. Macintosh and Colleagues (2010) found that 40% of their participants answered this question correctly. Mothers with tooth decay create a high risk for their child also having tooth decay, but over 70% of participants in our study selected an incorrect answer or picked the “I don’t know” option. This result was similar to another study where “Most interviewed adults did not know the concept of dental caries being an infectious and transmissible disease, and reported the habit of blowing and tasting food, sharing utensils and kissing the children on their mouth” (Sakai et al, 2008).

The current questionnaire also showed the majority of parents (70%) were unaware what tooth decay actually looked like.

**Figure 2. Ten questions that were answered well.**

**Figure 3. Ten questions that were not answered well.**

**Key:**

K Is the following statement True or False? Baby teeth are important because they help to guide adult teeth to the right place in the mouth.

L Standard dental treatment in New Zealand is free for every child, at what age do people have to start paying for their own care?

M A child should start flossing when two teeth start to touch, you will have to help them to begin with. How often should teeth be flossed?

N When is the most important tooth brushing time?

O Does fluoride toothpaste help prevent tooth decay and prevent cavities from getting worse?

P When should parents/caregivers start brushing their child’s teeth?

Q Is the following statement True or False? It is not necessary to fix cavities in baby teeth as they fall out anyway?

R At what age do “Adult” teeth start to come through?

S Which of the following is least likely to cause tooth decay?

T Do children who receive dental treatment under general anaesthetic still need to make regular dental visits?

A Early childhood tooth decay can affect children as early as?

B If a mother has active tooth decay, her infant’s risk level of having tooth decay is?

C Early childhood tooth decay begins as?

D What does the term “Lift the lip” mean?

E Children should be helped with tooth brushing until what age?

F If your child knocks out a new adult tooth in an accident you should?

G Is the following statement True or False? Children with early childhood tooth decay more likely to develop decay in their adult teeth?

H When should parents/caregivers take their baby for his/her first dental visit?

I Is visible plaque a sign that a child is at a high risk of developing cavities?

J When you are teaching your child to brush their teeth you should teach them to?
Macintosh and colleagues (2010) had similar findings with 65% of their participants unable to answer this question correctly.

The question asking parents what they thought the term “Lift the lip” meant, was poorly answered. The term has been used by District Health Boards from as early as 2002 (Nelson Marlborough District Health Board, 2002; Pinnacle, 2003) and again by the Ministry of Health in 2006 and 2008. In 2009 Auckland’s Starship Hospital promoted it as part of its oral health campaign and in 2010 both the New Zealand Dental Association and the Ministry of Health ran an education campaign highlighting the term “Lift the lip” (Starship Foundation, 2009; Ministry of Health, 2010). Despite its common use in New Zealand dental settings the term does not appear to have caught on with the general public. Only 35% of participants were able to answer the question correctly. Macintosh et al, (2010) asked the same question and found that 44% of participants were able to answer the question correctly.

The question with the most incorrect answers was; “Children should be helped with tooth brushing until what age?”. The correct answer based on the study by Macintosh et al, (2010) was 8 years of age. In our study 47% answered correctly, 48% answered incorrectly and 6% selected the “I don’t know” option. The results from the Macintosh paper showed 31% correct, 45% incorrect and 25% “I don’t know”.

By far the largest group of respondents were mothers. Children under the age of five usually spend the majority of their time with their mothers (Suresh et al, 2010) and it was expected that mothers would complete this questionnaire. A study in rural Australia (Gussy et al, 2008) had a similar return rate by mothers (94.9%) as to what we identified (93.9%). Mothers answered the questionnaire significantly better than non-mothers. A large number of researchers have specifically selected mothers as the target group (Blinkhorn et al, 2001; Finlayson et al, 2007; Bonanato et al, 2009; Suresh et al, 2010; Buerlein et al, 2011) but finding comparisons between the knowledge of mothers and fathers proved difficult.

A study in Nigeria (Abiola Adeniyi et al, 2009) of 404 mothers and their pre-school children showed that increasing maternal age was an important determinant of caries experience in their children. Another study in Pakistan confirmed this finding with younger age of the mother having a positive influence on the dental health practices of her pre-school children (Sufia et al, 2009). In contrast, other studies (Paunio et al, 1993; Harris et al, 2004) highlighted “mother’s young age” as a risk factor as younger mothers may pay less attention to their children’s tooth brushing habits. This however was not found to be consistent with our sample.

There were ethnic differences in percentage of correct responses. It is possible that this knowledge differential contributes to the actual inequalities that have been identified in numerous studies. Inequalities in the oral health of Indigenous children was highlighted in a review article which looked at reports from Australia, New Zealand, Canada and the USA. Reports show “substantial oral health inequalities exist in New Zealand, with Maori children experiencing higher prevalence and severity of dental caries relative to their non-Maori counterparts” (Parker et al, 2010).

Participants with university degrees were shown to be able to answer significantly better than other education groups. Our findings agreed with similar studies (Chan et al, 2002; Harris et al, 2004), showing a significant association between caries and education level of the parents. In contrast, a study (Paterson et al, 2011) of Pacific Island children living in South Auckland, New Zealand, found children whose parents had a higher education were more likely to have teeth filled or extracted. Paterson and colleagues suggested that parents were more likely to be in the work force and therefore less able to spend time with their children teaching them oral hygiene skills; another possible explanation could be that the parents were more likely to be able to afford dental care and therefore more likely to take their children to the dentist.

Our results revealed that smokers had less oral health care knowledge when answering the questionnaire. The researchers feel this indirectly supports the findings of other researchers. Maternal smoking was identified as a dental risk factor for children under the age of six years in a study from rural Japan (Tsubouchi et al, 1994) and other researchers (Aligne et al, 2003) have shown that one of the risks of early childhood caries was associated with exposure to second hand smoke.

Chan et al (2002) showed a significant association between caries and lower household incomes levels, while Harris and colleagues (2004) identified four studies where family income was significantly related to the prevalence and/or incidence of deciduous caries in children age six years and under. Our findings support previous studies (Finlayson et al, 2007) showing that families with annual household income over $100,000 had greater knowledge and answered the prevention questions significantly better than lower income groups.

Overall the researchers felt that the level of knowledge was acceptable. The mean percentage of correct responses by the sample was 65.1%, while the overall result is not outstanding the majority of questions were answered well. Three of the five questions answered poorly were specific to caries identification, one in relation to parent/child transmission risk, while the fifth question involved the age that children should be assisted with tooth brushing.

CONCLUSION

This exploratory study revealed a number of discrepancies in early childhood oral health knowledge. Parents who identified as being smokers, low income, low education or Maori displayed less knowledge. The sample revealed that most of the parents are aware of basic oral hygiene practices but also showed that there were deficits in specific aspects of oral health knowledge. These were reflected in relatively high number of uncertain answers in questions especially regarding early caries identification and vertical transmission of the dental caries.

The study shed some light into oral health promotion efficacy around Southland. Better delivery of the education and oral health care promotions may be needed to improve this. Perhaps oral health promoters including plunket nurses, teachers, dental therapists and dentists should show parents and provide visual aids to help identify dental caries in their own children at home. Parents should be targeted as early as antenatal classes to educate about the parent-infant transmission of dental caries through food, utensil sharing and general social behaviours.

In terms of future work it is recommended that more emphasis is directed at oral health care promotions and the education of parents. The researchers believe that improving oral health care knowledge would likely improve the effectiveness of future oral health programs. Determining whether education sessions actually improve the oral health of future generations is a project worthy of consideration.
ACKNOWLEDGEMENTS

We would like to acknowledge the assistance provided by the early childcare centres, without their support this project would not have been possible. We also appreciate the statistical guidance provide by Professor Murray Thomson and his advice on how to best present the large amount of data that we had accumulated.

REFERENCES


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