

# Oral health behaviours and perceptions reported by Indigenous Australians living in Darwin, Northern Territory

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**Objective:** To describe the reported oral health behaviours and perceptions of Indigenous Australians living in Darwin, Northern Territory and to compare those with estimates for Darwin and Australia derived from the National Survey of Adult Oral Health (NSAOH). **Participants:** A total of 181 Indigenous Australians aged 22 years and over living in Darwin, participating in screening for a wider randomised clinical trial, were included. **Method:** Information on socio-demographic characteristics, oral health status including oral health behaviours and perceptions was collected using a questionnaire. Differences between the Darwin study (DS) participants and Australians in NSAOH were made based on non-overlapping 95% confidence intervals. **Results:** Almost 72% of DS participants had last seen a dentist over a year earlier, compared to 47% and 39% of NSAOH Darwin and Australian participants, respectively. A higher proportion of DS participants usually visited a dentist because of a problem than NSAOH Darwin and NSAOH Australian participants. A higher proportion of DS participants had avoided or delayed a dental visit because of cost than NSAOH participants. Over three times as many DS participants rated their oral health as fair/poor compared to NSAOH participants. A higher proportion of DS participants had perceived gum disease and one or more symptoms of gum disease than NSAOH participants. A higher proportion of DS participants experienced toothache, felt uncomfortable about appearance of their mouth and avoided eating because of oral problems than NSAOH participants. **Conclusions:** A higher proportion of Indigenous Australians living in Darwin presented with non-optimal oral health behaviours and perceptions compared with both the Darwin and Australian general populations.

**Key words:** Indigenous Australians, oral health behaviours, perceptions

## Introduction

Australia's Indigenous population consists of Aboriginal and Torres Strait Island people. It was estimated to be 548,400 in 2011 and is projected to exceed 700,000 by 2021 (Australian Bureau of Statistics, 2011). The average growth rate of the Indigenous Australian population during this period is projected to be 2.2% per year, which is over 23% higher than that of the whole Australian population (Australian Bureau of Statistics, 2009). Indigenous Australians generally have worse health profiles including shorter life expectancies, greater morbidity and mortality rates for chronic diseases and poorer self-rated health in comparison to their non-Indigenous counterparts (Australian Bureau of Statistics, 2006; 2007; Skilton *et al.*, 2011). For instance, Indigenous Australians are 1.5 times more likely to be afflicted with at least one of the chronic conditions, diabetes, cardiovascular disease and kidney disease than non-Indigenous Australians (Australian Bureau of Statistics, 2007), and Indigenous people are almost two times more likely to report their health as fair or poor compared to non-Indigenous people (Australian Bureau of Statistics, 2006). That the average

health expenditure per person for Indigenous Australians in 2010–11 was 1.5 times that for non-Indigenous Australians is indicative of greater disease burden levels in the Indigenous population (Australian Institute of Health and Welfare, 2013). Every year, an average Indigenous Australian family can be confronted by major events including death, arrest, incarceration, hospitalisation, alcohol abuse, extreme violence and financial strains (Blair *et al.*, 2005). These events, along with other negative social impacts affecting Indigenous people such as colonisation, assimilation, segregation, racism and cultural annihilation could render them to be a socially victimised group compared with the general Australian population (Durie, 2004; Jamieson *et al.*, 2006; Parker *et al.*, 2010).

Although studies describing the oral health status of Indigenous Australians are limited, they all corroborate that oral health of both adult and child Indigenous populations is generally worse on all indicators compared to non-Indigenous Australians (Australian Institute of Health and Welfare, 2012; Australian Research Centre for Population Oral Health, 2009). For example, the number of decayed teeth and percentage of sites with 6+mm periodontal pockets were 2.2 times higher in Indigenous

adults than in non-Indigenous adults while the proportion of Indigenous children with dental caries was 1.2 times greater than that of non-Indigenous children (Australian Institute of Health and Welfare, 2012). Few studies have investigated oral health behaviours and perceptions among Indigenous populations (Slade *et al.*, 2007; Smith *et al.*, 2007). The first, the National Survey of Adult Oral Health 2004–06, included only 87 Indigenous Australians in a total sample of 5,505 examined and could therefore not be considered representative of the Indigenous population in Australia (Slade *et al.*, 2007). The second was confined to rural and remote Indigenous people of Western Australia (Smith *et al.*, 2007). Against this backdrop, there is a need for further research on oral health behaviours and perceptions among Indigenous Australians, the findings of which may be useful in oral health policy planning. The aim of the present study was to describe the oral health behaviours and perceptions of Indigenous adults living in Darwin and to compare those with the estimates for Darwin and Australia derived from National Survey of Adult Oral Health 2004–06 (NSAOH).

## Methods

Ethical approval for the study had been obtained from the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research, University of Adelaide Human Research Ethics Committee, and the Aboriginal Health Council of South Australia.

Participants were Indigenous adults aged 22 years and over who were residents of Darwin and part of the screening process for a wider randomised clinical trial, the Perio-Cardio study (Skilton *et al.*, 2011). Data collection occurred from June 2010 to January 2012. Participants were recruited through the use of flyers, posters, radio advertisements, newspaper advertisements, word-of-mouth (primarily through the study's Aboriginal research assistants) and via snow-balling techniques. Data from the Darwin study (DS) participants were collected through a questionnaire, which included information on socio-demographic characteristics, oral health status including oral health behaviours and perceptions via closed-ended questions with both Likert and non-Likert scales. The format of the questionnaire was almost identical to that was used in NSAOH. Assisted by study personnel, participants were asked to provide the most appropriate response of their choice to the questions that incorporated multiple responses. A summary oral health impairment variable was created by combining three items; experience of toothache, experience of discomfort due to mouth appearance and food avoidance. The questions asked were: How often during the last year did you have toothache?, How often during the last year did you feel uncomfortable about the appearance of your teeth, mouth or false teeth?, and, How often during the last year did you have to avoid eating some foods because of problems with your teeth, mouth or false teeth? For the purposes of this analysis, those who answered 'very often', 'fairly often' or 'occasionally' to any of the items were termed 'impaired oral health-any'. Other possible responses were 'hardly ever' or 'never'. Those who answered 'very often', 'fairly often' or 'occasionally' to

all of the items were termed 'impaired oral health-all' with severe oral health impacts.

The NSAOH was a cross-sectional investigation of oral health among Australians aged 15 years and above living in all states and territories (Slade *et al.*, 2007). A computer assisted telephone interview (CATI) was conducted among participants to obtain their perceptions of oral health and patterns of dental care. A three-stage, stratified, clustered sampling design was used in the NSAOH. Firstly, postcodes were selected then households chosen within those postcodes, and finally, one adult from each of those households selected for participation. Data were weighted to ensure estimates were representative of the Australian population. Weights were calculated to reflect probabilities of selection and to adjust for different participation rates across postcodes and among age and gender categories.

Response variables were dichotomised and their proportions and respective 95% confidence intervals (95%CI) were computed. As the two studies used different sampling methods, the datasets could not be merged. Statistical significance for comparisons of proportions between DS and NSAOH participants were thus based on non-overlapping 95%CI.

## Results

A total of 181 Indigenous Australians aged 22–74 years were included in the Darwin study while 495 and 11,021 participants of the same age range were included in NSAOH Darwin and NSAOH Australia studies, respectively. A comparison of socio-demographic characteristics indicated that despite being female-dominant, DS participants were reasonably comparable to Darwin Indigenous Australians (2011 census) in relation to age distribution and education level as well as housing and employment status (Table 1). Nearly all NSAOH participants had been to a dentist while 3.5% of DS participants had never seen a dentist (Table 2). Almost 72% of DS participants last saw a dentist over a year earlier compared to 47% and 39% of NSAOH Darwin and Australian participants respectively, whereas problem-oriented visits were much more common among DS participants than in regional and national samples (74.4% vs. 44.1% and 46.7%). Nearly 60% of DS participants were not afraid of seeing a dentist. This was not significantly higher than the 50% and 55% of NSAOH Darwin and Australian data. The proportion of DS participants who avoided or delayed a dental visit because of cost was significantly higher than that of NSAOH participants (59.5% vs. 36% and 34%).

The proportion of DS participants who rated their oral health as fair/poor (Table 3) was more than three times the proportion among NSAOH participants (62% vs. 17.4% and 17.5%). Perceived need for fillings or extractions among DS participants was more than double that of NSAOH Australians (70.8% vs. 30.7%). A significantly higher proportion of DS participants than NSAOH participants perceived having gum disease (32.8% vs. 10.1% and 11.1%) as well as having one or more symptoms of gum disease (82% vs. 49% and 50%) and had been told by a dentist that they had dento-alveolar bone loss (18% vs. 7% and 7%). A higher proportion of DS participants perceived that they had loose teeth without injury than

**Table 1.** Socio-demographic characteristics of DS participants compared to Indigenous Australians residing in Darwin from the 2011 Australian census and NSAOH Australians

Variable		DS participants 2010/12		Darwin Indigenous Australians 2011 census		NSAOH Australians 2004/06 survey	
		%	(95%CI)	%	(95%CI)	%	(95%CI)
Age	23-34 years	29.8	(23.1–36.6)	34.5	(32.9–36.2)	29.2	(23.5–27.4)
	35-54 years	54.1	(46.8–61.5)	46.2	(44.5–47.9)	45.9	(44.6–47.3)
	55-74 years	16.0	(10.6–21.4)	19.3	(18.0–20.7)	24.9	(23.7–26.1)*
Gender	Male	35.7	(29.1–42.9) <sup>#</sup>	48.2	(46.9–49.4)	50.1	(48.9–51.3)
	Female	64.3	(57.1–70.9) <sup>#</sup>	51.8	(50.6–53.1)	49.9	(48.7–51.1)
Education	Completed Year 12	29.7	(22.8–36.5)	22.9	(21.0–25.0)	58.1	(56.3–59.7)*
Housing	Own	4.7	(1.5–7.8)	8.2	(7.1–9.4)	42.5	(41.0–44.0)*
	Buying	30.2	(23.3–37.2)	25.5	(23.8–27.3)	37.4	(35.9–38.9)
	Renting	53.5	(46.0–61.0)	56.7	(54.7–58.7)	18.5	(16.9–20.1)*
	Rent free	11.6	(6.8–16.5)	6.6	(5.9–7.4)	1.2	(0.9–1.4)*
Employment status	Full-time	66.5	(58.8–73.4)	67.7	(64.7–70.6)	50.6	(49.2–51.9)*
	Part-time	12.0	(7.8–18.0)	15.0	(12.8–17.4)	21.0	(20.1–21.9)*
	Not employed	21.5	(15.8–28.6)	17.3	(15.1–19.9)	28.4	(27.2–29.7)*

<sup>#</sup> Non-overlapping 95%CI – DS participants vs. both Darwin Indigenous Australians (2011 census) and NSAOH Australians

\* Non-overlapping 95%CI – both DS participants and Darwin Indigenous Australians (2011 census) vs. NSAOH Australians

**Table 2.** Dental behaviours of DS participants compared to NSAOH Darwin and NSAOH Australian participants

	DS participants		NSAOH Darwin*		NSAOH Australia*	
	%	(95%CI)	%	(95%CI)	%	(95%CI)
Seen a dentist before	96.5	(92.6–98.4) <sup>#</sup>	99.4	(98.7–100)	99.8	(99.7–99.9)
Time since last dentist visit ≥1 year ago	71.9	(64.6–78.1) <sup>#</sup>	46.7	(42.3–51.2)	38.9	(37.7–40.1)
Usual reason for seeing a dentist Problem	74.4	(67.3–80.4) <sup>#</sup>	44.1	(39.7–48.6)	46.7	(45.3–48.2)
Scared about going to see the dentist - A little bit/a fair bit/heaps	40.3	(33.3–47.8)	50.5	(46.1–54.9)	44.7	(43.4–45.9)
Avoided or delayed visiting a dentist because of cost	59.5	(52.0–66.7) <sup>#</sup>	36.0	(31.8–40.2)	34.0	(32.7–35.3)
Difficulty paying \$100 bill - A little/a lot of difficulty	49.4	(42.0–56.8) <sup>#</sup>	36.8	(32.7–41.2)	39.7	(38.3–41.1)

\* Data are weighted for age and gender

<sup>#</sup> Non-overlapping 95%CI (DS participants vs. both NSAOH Darwin and NSAOH Australia participants)

in both samples of NSAOH participants (21.6% vs. 9% and 8%) and a higher proportion of DS participants had toothache than NSAOH participants (39% vs. 17% and 15%). A higher proportion of DS participants felt uncomfortable about the appearance of teeth, mouth or false teeth and avoided eating because of problems with their teeth, mouth or false teeth than in NSAOH. The prevalence of oral health impairment-any was twice as high in the DS participants compared to national estimates (80% vs. 39%). When the more severe measure, oral health impairment-all was used, the prevalence was more than three-fold among DS participants (23% vs. 7%).

## Discussion

Our findings revealed that the DS participants were similar to the general Darwin Indigenous population for age and socio-economic characteristics and were more likely to present with non-optimal oral health behaviours and perceptions in comparison to similarly-aged NSAOH Darwin and NSAOH Australian participants. For example, with regard to oral health behaviours, DS participants were

more likely to be less frequent, problem-oriented visitors to the dentist and avoiding or delaying visiting a dentist because of cost compared to NSAOH participants. In accordance with these findings, a higher proportion of Indigenous Australians compared to the general Australian population in NSAOH had been reported to have similar types of non-optimal oral health behaviours although the differences were not statistically significant (Slade *et al.*, 2007). Smith and co-workers (2007) have reported that about 65% of Indigenous Western Australians visited a dentist more than a year earlier and 78% of them were problem-oriented visitors - these findings are comparable to ours.

Self-reported oral health is a widely used summary measure of a person's own experience of oral health and is associated with functional impairment, discomfort and clinical measures of oral health. Our findings showed that more than three times as many DS participants perceived their oral health as fair/poor compared to both NSAOH Darwin and Australian participants. In comparison to NSAOH participants, DS participants scored significantly worse in relation to almost all other oral health percep-

**Table 3.** Dental perceptions of DS participants compared to NSAOH Darwin and NSAOH Australian participants

	<i>DS participants</i>		<i>NSAOH Darwin*</i>		<i>NSAOH Australians*</i>	
	%	(95%CI)	%	(95%CI)	%	(95%CI)
Self-rated oral health - excellent/very good/good	37.8	(30.9–45.2) <sup>#</sup>	82.6	(78.9–85.7)	82.5	(81.5–83.6)
Perceived need for fillings or extractions	70.8	(63.6–77.2) <sup>s</sup>	65.3	(61.0–69.5)	30.7	(29.5–31.8)
Perceived one or more of the following symptoms during the last 12 months (gums that hurt, gums that bleed, a bad taste in your mouth, bad breath)	82.3	(76.1–87.2) <sup>#</sup>	49.1	(44.7–53.5)	49.6	(48.3–50.8)
Perceived gum disease	32.8	(26.2–40.1) <sup>#</sup>	10.1	(7.7–13.1)	11.1	(10.3–11.9)
Told by a dental professional about the presence of dento-alveolar bone loss	18.1	(13.1–24.6) <sup>#</sup>	7.0	(5.0–9.7)	6.9	(6.3–7.5)
Had scaling, root planning, surgery or other treatment for gum disease	7.6	(4.5–12.6)	11.1	(8.6–14.3)	6.9	(6.3–7.5)
Had loose teeth without injury	21.6	(16.1–28.4) <sup>#</sup>	9.1	(6.8–12.0)	7.9	(7.3–8.5)
Experience of toothache in the last year <sup>a</sup> very often/fairly often/occasionally	39.2	(32.2–46.7) <sup>#</sup>	16.8	(13.8–20.5)	15.1	(14.4–15.8)
Felt uncomfortable about the appearance of teeth, mouth or false teeth in the last year <sup>b</sup> very often/fairly often/occasionally	60.6	(53.1–67.6) <sup>#</sup>	30.1	(26.2–34.3)	27.3	(26.4–28.1)
Avoided eating because of problems with teeth, mouth or false teeth in the last year <sup>c</sup> very often/fairly often/occasionally	53.8	(46.3–61.1) <sup>#</sup>	18.6	(15.4–22.3)	18.0	(17.3–18.7)
Prevalence of oral health impairment-any <sup>d</sup>	79.5	(72.9–84.9) <sup>#</sup>	45.4	(41.0–49.8)	39.4	(38.2–40.7)
Prevalence of oral health impairment-all <sup>e</sup>	23.4	(17.7–30.3) <sup>#</sup>	9.7	(6.3–13.0)	6.7	(5.8–7.5)

\* Data are weighted for age and gender

<sup>#</sup> Non-overlapping 95%CI (DS participants vs. both NSAOH Darwin and NSAOH Australia participants)

<sup>s</sup> Non-overlapping 95%CI (DS participants vs. NSAOH Australia participants only)

<sup>d</sup> A response of ‘very often’, ‘fairly often’ or ‘occasionally’ to the items a OR b OR c

<sup>e</sup> A response of ‘very often’, ‘fairly often’ or ‘occasionally’ to the items a AND b AND c

tions investigated. These findings could reflect actual disease status in Indigenous Australians who generally have poorer oral health levels compared to non-Indigenous Australians (Australian Institute of Health and Welfare, 2012; Slade *et al.*, 2007). Indigenous Australians are also confronted with problems regarding access to oral health services (Australian Research Centre for Population Oral Health, 2009), which in turn could be indicated by non-optimal oral health perceptions observed among them in the present study. Inadequate access to oral care and inability to cope with high oral health needs of Indigenous people have been cited as some of the main reasons for oral health disparities among Indigenous populations and their non-Indigenous counterparts in Australia, New Zealand, Canada and the USA (Parker *et al.*, 2010).

Important aspects of oral health such as experience of toothache, feeling uncomfortable about dental appearance and avoiding food due to oral problems cannot be ascertained during a standard oral epidemiological examination (Slade and Sanders, 2003). A higher proportion of DS participants presented with these aspects of oral health. That virtually half of the Indigenous people in the Western Australian study (Smith *et al.*, 2007) were not satisfied with their dental appearance was comparable to our findings where 60% of DS participants had a similar perception. Higher disease levels among Indigenous Australians alongside poor access to timely dental care could make them a vulnerable population more susceptible to negative impacts of oral health such as feeling uncomfortable about dental appearance and avoidance of food (Australian Research Centre for Population Oral Health, 2009).

Our findings demonstrate that despite being well employed (one reason may be the inclusion of Community Development Employment Projects’ participants as employed persons in DS study but not in the NSAOH study), DS participants were a relatively socially disadvantaged group compared to the general Australian population in many aspects including education level and house ownership, which is supported by previous reports (Australian Bureau of Statistics, 2011; Brennan *et al.*, 2007; Slade *et al.*, 2007). Despite the high employment rate when the study was carried out, however, there does not seem to have been an oral health benefit to the DS group during their life course; in other words, the employment project did not address the underlying pre-existing health inequality. Poor oral health status including non-optimal oral health behaviours and perceptions are shown to be linked with social inequality and socio-economic disadvantage coupled with inadequate access to health care (Sanders *et al.*, 2006; Sanders and Spencer, 2004). These factors, in turn, could contribute to the poor oral health status observed among the DS participants.

It would be worthwhile highlighting that DS participants were comparable to the general Indigenous adult population of Darwin (according to 2011 census data) in regard to almost all socio-demographic aspects studied including age distribution, education level, housing status and employment status notwithstanding the convenient nature of selection of our sample and the relatively small sample size. A greater tendency for females to participate in these sorts of studies was reflected by the dominance of females in our sample compared to Indigenous adults



of Darwin according to 2011 census data. It is noteworthy that NSAOH Darwin participants were comparable to NSAOH Australian general population in almost every aspect studied. It is important to bear in mind the difficulties encountered when recruiting vulnerable groups such as Indigenous Australians in health research projects. In an ideal world, a representative sample of Indigenous Australians would have been recruited in NSAOH (using the CATI process) however this was not the case. This means that other recruiting techniques that are known to be successful with this group, such as convenience sampling, need to be employed. Having face-to-face interviews may have also influenced responses, by increasing the likelihood of social desirability bias, for example.

In conclusion, our findings indicated that a higher proportion of this convenience sample of Indigenous Australians in Darwin reported oral health behaviours and perceptions detrimental to oral health compared to both regional and national level estimates. The prevalence of these non-optimal oral health behaviours and perceptions among our Indigenous sample was generally higher than those reported previously.

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