

Dental health, dental neglect, and use of services in an adult Dunedin population sample

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SUMMARY

Considerable social and economic changes have occurred since New Zealand's last national oral health survey over 13 years ago. The effects of those changes on adult oral health and the use of dental services remain largely unknown. The aims of this study were to examine self-reported oral health and the use of dental services in an adult Dunedin population sample, and to examine their associations with dental neglect using an established scale. A descriptive survey of a random sample of 600 residents in the Dunedin South Electorate resulted in a 78.2 percent response rate (14 questionnaires were returned "address unknown").

Of the 458 respondents, nearly two-thirds were female, and almost all were European. Of the 385 dentate respondents (84.1 percent), 62.5 percent usually visited a dentist for a check-up, and 66.6 percent had visited a dentist within the previous year. The mean dental neglect score for dentate respondents was 12.4 (sd, 4.4), and was higher among younger people and those in the lowest occupational group. Compared with past national and regional oral health surveys, a higher proportion of respondents rated their oral health poorly, did not pay for their last dental treatment, and received their last dental care from a public dental service. Although the study was small in scale, and was conducted in an area in which there is access to low-cost dental care through the School of Dentistry, University of Otago, the findings are considered a useful contribution to the overall picture of the use of dental services by New Zealanders.

Information obtained from cross-sectional studies is essential in monitoring trends in oral health, assessing levels of dental need, evaluating the effectiveness of oral-health promotional strategies, planning oral-health policies, and highlighting dental issues politically¹. Much of what is known about adult oral health and dental health-service utilisation in New Zealand has been obtained from such investigations, but only two have been conducted at a national level. These were the Survey of Adult Oral Health (SAOH) in 1976² and the Survey of Oral Health Outcomes (SOHO) in 1988³.

Based on the findings of those surveys, Cutress and Hunter predicted New Zealanders' future oral health and use of dental services⁴, and forecast that the need for dental care would decrease due to a continuing decline in dental caries. However, more recent evidence suggests that this predicted decrease in disease has not occurred uniformly across the population, and that factors relating to the cost, access, appropriateness, and acceptability of dental services are at least partially responsible for this^{5,6}. Good dental health is generally associated with being European and middle class;

older, institutionalised people and people with disabilities, ethnic minorities, and low socio-economic status (SES) groups are disproportionately represented among those who are dentally disadvantaged⁴⁻¹⁰. Moreover, only about 50 percent of the New Zealand population utilises dental services regularly^{2,11}, the needs of the remaining 50 percent being met on a largely episodic, *ad hoc* basis.

Since the last national oral health survey, the numbers of people in older age groups, in ethnic minorities, and in low-SES groups have risen, suggesting that the dentally disadvantaged proportion of the population may have increased^{5,7,8,11,12}. Resource constraints have meant that the publicly funded dental services have been able to provide little more than emergency care for those groups¹³.

The utility of self-report approaches for measuring oral health has been demonstrated in a number of studies¹⁴⁻²⁴, the findings of which were similar to more clinically oriented investigations, but obtained in a cheaper and less invasive manner. Locker and Miller²⁵ argued that an individual's self-assessment of his or her oral health is one of the key determinants of the use of dental services, rather than a clinical diagnosis arrived at using professional dental norms. For this reason, greater use of self-report scales in dental health services research is likely²⁶.

Dental neglect is an entity measurable by the Dental Neglect Scale^{22,27}, and has been shown to be associated with a wide range of dental clinical and behavioural indicators. It has been described as an individual's failure to take precautions to maintain oral health, omitting to obtain needed dental care, and neglecting the dentition and associated tissues. Higher dental neglect scores have been shown to be associated with low social class, higher numbers of decayed and missing teeth, high plaque levels, episodic use of dental services, poor self-rated oral health, and poor oral self-care behaviours²⁷. These findings suggest that the scale may be a useful substitute for clinical data in oral health surveys when resource constraints preclude the examination of participants.

The aim of this study was to investigate self-reported oral health, the use of oral care services, and dental neglect in a sample of Dunedin adults.

METHODS

This is a cross-sectional descriptive survey involving a self-report socio-dental questionnaire sent to 600 people randomly selected from the Dunedin South Electoral Roll. The random sampling procedure in the Statistical Package for the Social Sciences (SPSS)²⁸ was used, and the sex and age distributions of the sample checked against those of the Electoral Roll to confirm that the random selection procedure had been successful. Ethical approval for the study was obtained from the Otago Ethics Committee.

Questions pertaining to respondents' socio-demographic^{29,30}, oral care and self-care, and oral health-impact characteristics were based upon those used in a previous socio-dental survey of a New Zealand population group³¹. The Dental Neglect Scale²⁷ (Table I) was also used. The questionnaire was sent with a covering letter, information sheet, and freepost self-addressed envelope. The covering letter asked that the questionnaire be completed by the person in the household over the age of 18 years and closest to having the next birthday. If that person was unable to complete the questionnaire, the person over the age of 18 who had the last birthday in the household was asked to do so. As an incentive to return completed questionnaires, all respondents were entered in a draw to win \$100.

TABLE I – The Dental Neglect Scale and scoring system.

	Definitely no			Definitely yes		
1. I keep up my home dental care	1	2	3	4	5	
2. I receive the dental care I should	1	2	3	4	5	
3. I need dental care, but I put it off	1	2	3	4	5	
4. I brush as well as I should	1	2	3	4	5	
5. I control snacking between meals as well as I should	1	2	3	4	5	
6. I consider my dental health to be important	1	2	3	4	5	

Assigning scores: Respondents circle one response per item. Score frequencies should be reversed so that high scores are associated with high levels of dental neglect. A Dental Neglect score is the sum of the individual item scores. Possible score ranges are from 6–30.

Standard follow-up procedures³² were used: 1 week after the first mail-out, respondents were sent a reminder postcard; 2 weeks after the initial mail-out, those yet to respond were sent an additional questionnaire and covering letter; and 6 weeks after the initial mail-out, the remaining individuals who had not yet responded were sent a third questionnaire and covering letter. Data collection ended 4 weeks after the third mail-out, and a random sample of 10 percent (60 respondents) was sent a second questionnaire to test respondent reliability. Data were entered into a database by the senior author; data from the 60 respondents who returned a second copy of the questionnaire were entered twice by LMJ, and once by a layperson experienced in data entry. Scores for the Dental Neglect Scale were computed by adding the individual response scores provided for each of the six items in the scale.

The level of statistical significance was set at $P < 0.05$. The Chi-square test was used to compare differences for categorical dependent variables, and ANOVA was used when the dependent variable was continuous. The Kappa statistic was used to determine levels of test-retest reliability for six key variables (sex, ethnicity, dentate status, usual reason for dental visit, last reason for dental visit, and brushing frequency); these were all found to be acceptable, being within the range of 0.89 to 1.0.

RESULTS

Of the 600 questionnaires originally sent, 14 were returned as "address unknown"; 458 (78.2 percent) of the remainder were completed and returned. The socio-demographic characteristics of respondents in the current study and those in the Dunedin South Electorate³³ (Table II) indicated that people aged between 45 and 64 years, females, and those with a tertiary education were over-

represented in the sample. Subsequent data are presented for the 385 dentate respondents (84.1 percent), of whom 34.6 percent were holders of a Community Services Card (CSC).

Well over half the participants (62.5 percent) usually visited a dentist for a check-up (Table III), that proportion being higher among older respondents and those of higher

TABLE II – Socio-demographic characteristics of respondents in the current study and the percentage of people in the Dunedin South Electorate with the corresponding characteristic³³.

	Study		Electorate
	All	Dentate	
Age group			
18-44 years	47.6	54.8	59.2
45-64 years	34.1	34.0	25.2
65+ years	18.3	11.2	15.6
Sex			
Male	36.7	37.1	49.3
Female	63.3	62.9	50.7
Ethnicity			
European	95.0		92.2
Maori	1.8		5.1
Pacific Islander	0.4		1.0
Other	2.8		1.7
Education			
Primary, secondary school, or trade qualification	71.0	70.0	92.1
Tertiary	29.0	30.0	7.9
Income Source			
Wage or salary	65.2	74.5	62.8
Benefit or superannuation	35.8	25.5	37.2
Community Services Card			
No	58.8	65.4	
Yes	41.2	34.6	

social class (irrespective of which of the three social status indicators was used). Two-thirds had visited a dentist within the previous year, and similar age and social-class patterns were observed. The last dental visit of over four-fifths (82.4 percent) had been to a private dentist, although more of those of lower social class had sought publicly funded services. Approximately half the respondents cited a check-up as the reason for their last visit, and that proportion was greater among those of higher social class. Most respondents had paid for their own dental care, although more of the younger people and those in the lowest occupational group had had State assistance.

Most participants (95.8 percent) reported brushing daily or more often (Table IV). Two-thirds used floss "sometimes or every day", and this was higher among older respondents, females, and those without a CSC. Over 40 percent rated their oral health as "better than average", and this proportion was greater among those of higher social class. Toothache in the previous 4 weeks was relatively rare, only 1 in 10 respondents (but fewer males) reporting its occurrence.

Dental-neglect scores were normally distributed, and ranged from 6 to 29 (Table V), with a mean of 12.4 (sd, 4.4). Dental neglect was greater among younger respondents and those in the lowest occupational group. Episodic dental visitors, those who had not visited for a long time, and those who did not pay privately for their last treatment also had higher dental-neglect scores.

Dental-neglect scores were higher among those with less favourable oral self-care behaviours and in those with poorer self-rated oral health (Table VI). Scores were also higher among those who reported oral-health impacts

TABLE III – Oral care characteristics of the respondents by socio-demographic variables (percentages; dentate respondents only, N=385).

Socio-demographic characteristics	Oral care characteristics				
	Usually attend for check-up	Last visit <1 year previously	Private dentist last visit	Last visit was check-up	Paid out-of pocket for last dental treatment
All combined	62.5	66.6	82.4	51.8	91.7
Age group					
18-34 years	58.7*	59.9†	78.9	54.1	86.7*
35+ years	66.3	73.3	85.9	49.5	96.7
Sex					
Male	65.5	67.1	81.4	55.2	91.6
Female	59.5	66.1	83.4	48.4	91.8
CSC status					
No	68.3†	71.5‡	89.0§	57.0*	95.6*
Yes	56.7	61.7	75.8	46.6	87.8
Education					
Primary or secondary	58.6‡	63.0	78.1‡	47.8‡	86.8
Trade	55.7	65.7	85.3	44.3	98.6
Tertiary	73.2	71.1	83.8	63.3	89.7
Occupational group					
High	83.6§	82.2‡	93.2§	68.5§	98.6*
Medium	62.4	66.1	87.4	53.2	96.5
Low	41.5	51.5	66.6	33.7	80.0

*P<0.01

†P<0.005

‡P<0.05

§P<0.001

TABLE IV – Self-care, self-reported oral health, and oral health impact characteristics of the sample by socio-demographic variables (percentages; dentate respondents only, N=385).

Socio-demographic characteristics	Brushes daily or better	Flosses sometimes or every day	Self-rated oral health better than average	Experienced toothache occasionally, fairly often, or often in the past 4 weeks
All combined	95.8	66.9	40.5	9.9
Age group				
18-34 years	93.6	60.3†	41.4	11.7
35+ years	98.0	73.5	39.6	8.1
Sex				
Male	93.6*	52.5‡	46.2	6.3*
Female	98.0	81.3	34.8	13.5
CSC status				
No	96.0	70.0†	43.8	10.2
Yes	95.6	63.8	37.2	9.6
Education				
Primary or secondary	95.1	62.1	34.6*	9.7
Trade	95.7	65.2	42.1	11.4
Tertiary	96.6	73.4	44.8	8.6
Occupational group				
High	100.0	76.7	56.2§	9.2
Medium	96.5	65.7	42.1	9.2
Low	90.9	58.3	23.2	11.3

*P<0.05 †P<0.01 ‡P<0.001 §P<0.005

occasionally or more frequently, indicating that their oral health conditions had some impact on their daily lives.

DISCUSSION

As with any community survey, the representativeness of the sample is a critical issue. The data in Table I suggest that the sample was over-represented by those aged 45+ years, females, and by those who had received a tertiary level of education. This strongly suggests that we failed to obtain a representative sample, despite using a random sampling procedure. It could have been that people in these groups had more interest in the topic, and so elected to complete the questionnaire themselves, as opposed to following the instructions as specified (that is, for the questionnaire to be completed by the person in the household aged 18 years or above and having the next birthday). Similar experiences

have been reported from other studies which used the postal self-report method^{31,34,35}.

The sample was divided into the 18-34 and 35+ age groups to distinguish those who grew up before and after the introduction of fluoride dentifrices, which are seen as being largely responsible for the decline in caries in the last three decades³⁶. The two groups not only differed in their pattern of dental-service use, but also in their self-care behaviours. Although it is impossible to distinguish between the two eras and the aging process in their effects, the findings suggest that those who experienced a high past restorative treatment burden may be more prepared to "look after" their teeth now. There is some support for this in the older group's lower dental neglect scores.

Comparison of the current study's findings with those from the last national oral health survey³ shows that the proportion

TABLE V – Mean Dental Neglect scores by socio-demographic and oral care characteristics (dentate respondents only, N=385).

	Mean Dental Neglect score (sd)
All combined	12.4 (4.4)
Socio-demographic characteristics	
Age group	
18-34 years	14.3 (4.5)*
35+ years	11.3 (3.8)
Sex	
Male	12.5 (4.8)
Female	12.2 (4.1)
CSC status	
No	12.2 (4.4)
Yes	12.7 (4.4)
Education	
Primary or secondary	12.5 (4.7)
Trade	12.9 (4.7)
Tertiary	11.9 (3.6)
Occupational group	
High	10.9 (3.3)*
Medium	12.4 (4.3)
Low	13.5 (4.8)
Usual reason for attending dentist	
Problem	15.0 (4.6)*
Check-up	10.9 (3.5)
Time since last dental visit	
Less than one year	11.2 (3.8)*
Between 1-5 years	14.3 (4.5)
Over 5 years	16.6 (4.7)
Dental service provider last used	
Private dentist	12.2 (4.2)
Other	13.2 (4.8)
Reason for last dental visit	
Problem	13.9 (4.8)*
Check-up	11.1 (3.5)
Method of payment for last dental treatment	
Out of own pocket	12.2 (4.3)†
State-funded or did not have to pay	14.5 (4.3)

*ANOVA: $P < 0.001$ †ANOVA: $P < 0.01$

of people who reported that their last visit was symptom-related was similar in both studies (at around 48 percent), despite changes in dental-health policy (for example, the passing of the Dental Act in 1988, which allowed dentists to advertise freely for the first time) and campaigns (such as “Call Your Dentist”) which have occurred since the earlier survey. It may be that there has been no increase in awareness that routine dental check-ups are more desirable than presenting only when a problem occurs. Alternatively, changes in awareness may have occurred, but barriers remain which prevent more regular utilisation of dental services.

Having to pay privately for dental care appeared to be a substantial barrier for participants in the current study – over 80 percent of those who provided comments mentioned cost as a deterrent to more regular dental care. However, dental services for New Zealand adults are largely funded privately through users’ out-of-pocket payments³⁷, and this was reflected in the 91.7 percent of dentate respondents who paid in this manner. Noteworthy was that nearly 15 percent of respondents had had their most recent dental care at the University of Otago’s School of Dentistry, and those who provided comments stated that their dental care needs would remain unmet if this service were not available.

Further comparison with the last national dental survey suggests that oral self-care has improved considerably since 1988, particularly with respect to the use of dental floss (although it may be argued that combining the

TABLE VI – Mean Dental Neglect scores by self-care, self-reported oral health, and oral health impact characteristics (dentate respondents only, N=385).

	Mean Dental Neglect score (sd)
Frequency of brushing teeth	
Once or more a day	12.2 (4.2)*
Less than once a day	16.3 (6.8)
Frequency of flossing teeth	
Never or rarely	14.1 (4.9)†
Sometimes or every day	11.5 (3.8)
Self-rated oral health	
Better than average	10.7 (3.5)†
Average	13.0 (4.3)
Below average	15.9 (4.9)
Frequency of toothache in previous 4 weeks	
Never or hardly ever	12.0 (4.2)†
Occasionally, fairly often or often	15.3 (4.3)
Discomfort with mouth in previous 4 weeks	
Never or hardly ever	12.0 (4.2)†
Occasionally, fairly often or often	14.3 (4.8)
Embarrassment because of teeth in previous 4 weeks	
Never or hardly ever	12.1 (4.3)*
Occasionally, fairly often or often	14.4 (4.7)

*ANOVA: $P < 0.005$ †ANOVA: $P < 0.001$

“sometimes-every day” categories masks a still-high proportion of, at best, sporadic users). This may reflect all or some of the following: increased dental awareness among the general adult population; the effects of oral-health promotion campaigns; changes in societal expectations regarding oral hygiene; better marketing of self-care products; greater media coverage of oral health and associated issues; a higher proportion of dentate individuals in the population (meaning that it is now the norm for adults to retain and look after their teeth); or respondents giving what they thought was the more socially desirable response.

This study’s socio-demographic and oral-care associations with dental neglect were similar to those observed in previous studies using the Dental Neglect Scale^{22,27}. Proportionally more of those with higher scores were in the low occupational group, attended for dental care infrequently and for symptom-related reasons, did not pay out-of-pocket for their last dental care, had poor self-rated oral health, and reported poor oral self-care. It may be concluded, therefore, that dentally disadvantaged groups have high levels of dental neglect, and that, by measuring dental neglect, a reasonably useful indication of a group’s oral health and dental-service utilisation characteristics may be obtained²⁷.

Those who favour clinically based methods of obtaining oral-health information may be sceptical of the Dental Neglect Scale’s usefulness for socio-dental surveys. However, with the high financial, time, and personnel costs of conducting clinical surveys (not to mention the increasingly stringent protocols required by ethics committees), it could be that such self-report scales may become the more practical approach to assessing the oral health of New Zealanders in the future, particularly for making regional or local comparisons.

Although the study was small in scale, and was conducted in an area in which there is access to low-cost dental care through the School of Dentistry, its findings are considered to contribute useful information to the overall picture of the use of dental services by New Zealanders.

REFERENCES

1. Burt BA. How useful are cross-sectional data from surveys of dental caries? *Community Dentistry and Oral Epidemiology* 25: 36-41, 1997.
2. Cutress TW, Hunter PBV, Davis BP, Beck DJ, and Croxson LJ. *Adult Oral Health and Attitudes to Dentistry in New Zealand 1976*. Wellington: Medical Research Council of New Zealand, 1979.
3. Hunter PBV, Kirk R, and de Liefde B. *The Study of Oral Health Outcomes. The New Zealand Section of the WHO Second International Collaborative Study*. Wellington: Department of Health, 1992.
4. Cutress TW and Hunter PBV. Past, present, and future trends in dental health and the dental system in New Zealand. *New Zealand Dental Journal* 88: 2-9, 1991.
5. Whyman RA, Treasure ET, and Ayers KMS. Dental disease levels and reasons for emergency clinic attendance in patients seeking relief of pain in Auckland. *New Zealand Dental Journal* 92: 114-117, 1996.
6. Thomson WM. Ethnicity and child dental health status in the Manawatu-Wanganui Area Health Board. *New Zealand Dental Journal* 89: 12-14, 1993.
7. Treasure ET and Whyman RA. Changing patterns of dental disease and the implications for dental practice. *New Zealand Dental Journal* 91: 8-11, 1995.
8. Brown RH and Treasure ET. Inequities in oral health: implications for the delivery of care and health promotion. *New Zealand Dental Journal* 88: 132-138, 1992.
9. de Liefde B and Ritchie GR. Evaluation of dental public health in New Zealand. *New Zealand Dental Journal* 80: 8-14, 1984.
10. Thomson WM, Brown RH, and Williams SM. Dental status and treatment needs of a New Zealand institutionalised elderly population. *New Zealand Dental Journal* 87: 119-123, 1991.
11. Thomson WM. Predicted distribution of treatment needs for caries across three indicator age groups by the year 2031. *New Zealand Dental Journal* 93: 39-43, 1997.
12. Edward SJ. How the Maori community sees the dental-care system. *New Zealand Dental Journal* 88: 128-131, 1992.
13. Roddick A. Leadership in dental public health? Wanted: a catcher in the rye. *New Zealand Dental Journal* 94: 152-155, 1998.
14. Corah NL. Development of a Dental Anxiety Scale. *Journal of Dental Research* 48: 596, 1969.
15. Davies AR and Ware JE. Measuring patient satisfaction with dental care. *Social Science and Medicine* 15A: 751-760, 1981.
16. Gooch BF, Dolan TA, and Bourque LB. Correlates of self-reported dental health status upon enrolment in the Rand Health Insurance experiment. *Journal of Dental Education* 53: 629-637, 1989.
17. Atchison KA and Dolan TA. Development of the Geriatric Oral Health Assessment Index. *Journal of Dental Education* 54: 680-687, 1990.
18. Slade GD and Spencer AJ. Development and evaluation of the Oral Health Impact Profile. *Community Dental Health* 11: 3-11, 1994.
19. Leao A and Sheiham A. Relationship between clinical dental status and subjective impacts on daily living. *Journal of Dental Research* 74: 1408-1413, 1995.
20. Thomson WM, Stewart JF, Carter KD, and Spencer AJ. Dental anxiety among Australians. *International Dental Journal* 46: 320-324, 1996.
21. Nuttall NM. Initial development of a scale to measure dental indifference. *Community Dentistry and Oral Epidemiology* 24: 112-116, 1996.
22. Thomson WM, Spencer AJ, and Gaughwin A. Testing a child dental neglect scale in South Australia. *Community Dentistry and Oral Epidemiology* 24: 351-356, 1996.
23. Thomson WM, Chalmers JM, Spencer AJ, and Williams SM. The Xerostomia Inventory: a multi-item approach to measuring dry mouth. *Community Dental Health* 16: 12-17, 1999.
24. Thomson WM, Dixon GS, and Kruger E. The West Coast Study II: Dental anxiety and satisfaction with dental services. *New Zealand Dental Journal* 95: 44-48, 1999.
25. Locker D and Miller Y. Evaluation of subjective oral health status indicators. *Journal of Public Health Dentistry* 54: 167-176, 1994.
26. Locker D. Applications of self-reported assessments of oral health outcomes. *Journal of Dental Education* 60: 494-500, 1996.
27. Thomson WM and Locker D. Dental neglect and dental health among 26-year-olds in the Dunedin Multidisciplinary Health and Development Study. *Community Dentistry and Oral Epidemiology* 28: 414-418, 2000.
28. Puri BK. *Statistics in Practice: An Illustrated Guide to SPSS*. London: Arnold, 1996.
29. Elley WB and Irving JC. The Elley-Ingving Socio-Economic Index. 1981 Census Revision. *New Zealand Journal of Educational Studies* 20: 115-128, 1985.
30. Irving JC and Elley WB. A Socio-Economic Index for the female labour force in New Zealand. *New Zealand Journal of Educational Studies* 12: 154-163, 1977.
31. Dixon GS, Thomson WM, and Kruger E. The West Coast Study I: Self-reported dental health and the use of dental services. *New Zealand Dental Journal* 95: 38-43, 1999.
32. Dillman DA. *Mail and Telephone Surveys: The Total Design Method*. New York: John Wiley and Sons, 1978.
33. Statistics New Zealand. *Household Labour Force Survey: March 2000 Quarter*. Wellington: Department of Statistics, 2000.
34. Locker D and Miller Y. Subjectively reported oral health status in an adult population. *Community Dentistry and Oral Epidemiology* 22: 425-430, 1994.
35. Lloyd P, Lupton D, and Donaldson C. Consumerism in the health care setting: an exploratory study of the factors underlying the selection and evaluation of primary medical services. *Australian Journal of Public Health* 15: 194-201, 1991.
36. Burt BA. Prevention policies in the light of the changed distribution of dental caries. *Acta Odontologica Scandinavica* 56: 179-186, 1998.
37. Devlin NJ. The dimensions of dentistry: how much do New Zealanders spend on dental care? *New Zealand Dental Journal* 83: 66-71, 1987.

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