

IN BRIEF

- Regular care is defined as a visit for care within two years.
- Oral health is defined within the psychosocial framework of 'discomfort, disability and discontent'.
- Significantly more registered patients are regular than irregular attenders.
- Significantly more regular attendees are healthier compared with irregular and new patients.
- A 15 month registration time frame is inconsistent with developing equitable services.

The impact of attendance patterns on oral health in a general dental practice

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Objective The aim of this study was to examine the impact of attendance patterns on oral health in the context of government policy on dental care and registration in the UK.

Method The data involved 643 consecutive patient responses to a questionnaire on dental health taken from a survey that was conducted during 1998 in an urban area of Swansea. The survey continued for a period of six months and covered patients of 18 years of age and over, responding to a questionnaire on the subjective oral health status indicators including the pattern of their attendance to dental practices.

Results Regular dental care attendance has a significant positive impact on dental health while its impact on the number of teeth present is insignificant. Regular attendees also suffer significantly less from the severity, prevalence, social and psychological impacts of dental health problems.

Conclusion Regular dental attendance is associated with better oral health when regularity of care is defined as a visit within a two-year period. The rationality of a 15 month registration period is therefore debatable in the context of developing equitable services.

INTRODUCTION

There is an assumption that regular dental care improves oral health, thus the dental contract of 1990 included patient registration.¹ This was meant to encourage regular attendance and continuing care.² Registration was for a period of two years. However, in 1996 the period of registration was reduced to fifteen months.³ This reduction in the registration period resulted in financial savings to government. *The Scientific Basis of Dental Health Education*⁴ advocates regular dental attendance, at least one visit per year, to promote oral health. However, registration is an imperfect measure of regular attendance.⁵ It is necessary to consider registration and attendance separately in the context of developing equitable oral health services as those with greatest need (high risk

individuals) will require more frequent monitoring compared with low risk disease inactive individuals.

Based on need, there is conflicting evidence on the value of regular dental attendance.^{6,7} On the one hand, regular attenders have been shown to have higher dental caries incidence,⁸ experience greater negative impacts as a result of care^{9,10} and do not benefit from preventive interactions.¹⁰ On the other hand, it has been reported that regular attenders have better oral health, a higher number of functioning teeth,^{8,10} and experience less pain and untreated disease.⁶

The few studies which have examined oral health in patients attending general dental practices suggest that regularly attending patients experience benefit from care when compared with those attending less regularly.^{11,12}

According to the English Oral Health Strategy, oral health is a standard of health of the oral and related tissues which enables an individual to eat, speak and socialise without active disease, discomfort or embarrassment and which contributes to general well being.¹³ The use of quality of life measures in oral health assessments is now being promoted by dental professionals.^{14,15} An example of an oral health quality of life measure is the SOHSI (Subjective Oral Health Status Indicators). It is particularly useful as it measures the individual components of oral health as defined in the above strategy.¹⁶

In the light of this strategy and current registration policy, the aim of this paper is to investigate dental attendance patterns and oral health in adults attending a general dental practice. The question to be examined is that adults who attend regularly will have better oral health than those who do not attend regularly for dental care. Also, new patients who did not have a record of previous dental attendance were also compared with these groups.

METHODS AND MATERIALS

The survey of oral ill health and dental attendance patterns was initiated in December 1998 and continued for a period of six months. The setting for this study was a dental practice in an urban area of Swansea, South Wales. Consecutive patients aged 18 years and older were recruited into the study as they presented for dental examination or treatment. Patients were invited to complete a questionnaire during their visit for care. Patients were given assistance from dental health educators if they suffered from literacy or eyesight problems.

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The instrument used in this study was the SOHSI. The questionnaire measured oral disease and its consequences: functional limitation, pain and other symptoms and complaints, and disability and handicap.

The clinical record card provided evidence of attendance so as to categorise individuals as regularly attending, irregularly attending, or new patients. Based on the original registration period from the 1990 contract, irregularly attending individuals were those who attended for care more than two years prior to attendance.

Socio-demographic data were established from the record card and, if necessary, enquired during the consultation for care. Deprivation status was obtained from the postcode using the Index of Multiple Deprivation.¹⁷ Oral health was based on the measures of oral health established from the SOHSI which are highlighted in the *Oral Health Strategy Definition of Oral Health*. A copy of this questionnaire is included as an appendix to highlight the components on which the base data was collected. The factors included clinical, tooth loss characteristics as well as the non-clinical factors such as the ability to eat, speak and socialise, discomfort, general well being and disease activity. In the latter, dentists provided an opinion as to whether the patients were orally healthy or diseased. General well being was considered to be present if the subject was able to perform all the daily tasks. A zero score is used to indicate general well being while a score of six indicated the most severe limitation.

Table 1 Attendance profile.

	Sample % (n)
Regular	70.4 (449)
Irregular	7 (45)
New patients	22.6 (144)
All	638
P value	0.000

Table 2 Frequency of patients by sociodemographic variables.

Table 2a) Frequency of patients by age.

	18-29 % (n)	30-39 % (n)	Age 40-49 % (n)	50-59 % (n)	60-69 % (n)	>70 % (n)
Regular	45.51 (71)	71.70 (114)	78.51 (95)	84.27 (75)	91.67 (44)	87.50 (14)
Irregular	25.00 (39)	7.55 (12)	3.31 (4)	4.49 (4)	0.00 (0)	6.25 (1)
New patients	29.49 (46)	20.75 (33)	18.18 (22)	11.24 (10)	8.33 (4)	6.25 (1)
All	156	159	121	89	48	16
P value	0.001	0.000	0.000	0.000	0.000	0.096

Table 2b) Frequency of patients by gender and marital status.

	Sex		Marital status	
	Male % (n)	Female % (n)	Married % (n)	Not married % (n)
Regular	72.01 (211)	74.19 (207)	80.65 (275)	56.42 (130)
Irregular	6.83 (20)	3.94 (11)	4.99 (17)	5.45 (13)
New patients	21.16 (62)	21.86 (61)	14.37 (49)	27.63 (64)
All	293	279	341	230
P value	0.000	0.000	0.000	0.000

Table 2c) Frequency of patients by socioeconomic group.

	Most deprived % (n)	2nd most deprived % (n)	Other % (n)
Regular	56.40 (97)	74.76 (77)	77.64 (191)
Irregular	11.63 (20)	6.80 (7)	3.25 (8)
New patients	31.98 (55)	18.45 (19)	19.11 (47)
All	172	103	246
P value	0.000	0.000	0.000

Limitation in chewing capacity was present if there was inability to chew one or more indicator foods. A score of zero indicated no functional limitation and a score of five indicated the most severe limitation.

In the 'ability to speak', the measure scores 0-4 represent never, sometimes, fairly often, very often, all the time. Patients answering never to both questions were considered to have no speech impairment as a consequence of oral ill health.

Three measures were used for the 'ability to socialise/embarrassment'; one established social and psychological impact, another established worry or concern about oral health problems, and another established satisfaction with oral health.

(i) The social and psychological impact measure referred to the frequency of problems with eating and communication/social interaction. Patients answering 'never' to all questions were considered to have no social and psychological impact as a consequence of oral ill health.

(ii) Worry caused by oral health problems was established by asking the two questions as listed in the SOHSI questionnaire within this category. Patients answering 'never' to both questions were considered to have no worries as a consequence of oral ill health.

(iii) The satisfaction measure addressed the appearance of the teeth and/or dentures, ability to chew and ability to speak clearly. Patient's satisfaction was identified by the scores of 0 and 1.

Discomfort was expressed through pain and other symptoms. Out of the nine listed items, a separate factor was established to indicate the severity of pain. This was expressed through a four-point scale ranging from 'no pain' (0) to 'severe pain' (3). The prevalence of other symptoms during the previous four weeks was established through a twelve-item inventory questions. Similar to pain, the severity of other symptoms was expressed through a compound variable with a score of two to represent 'a lot' to zero for 'not at all'.

Analysis of the data

Chi-square tests of independence were used to examine relationships between patterns of attendance and SOHSI variables and goodness-of-fit tests were used to test the uniformity of distribution within specific variables. Cronbach's alpha was used to test internal reliability.

RESULTS

Six hundred and forty-three consecutive patients completed a questionnaire between the months of December and June. There were no refusals but five questionnaires were unusable as most of the responses were missed out. The attendance profile of the sample is shown in Table 1 showing that over 70% were regular attendees. Socio-demographic details are shown in Table 2. The average age for the sample was 41.29 years with a standard deviation of 13.82. People in the 18-29 age group had more irregular attendees than those in other age groups.

Oral Health

Overall, 67.3% thought of themselves as having 'good' to 'excellent' health. Significantly more regular attendees perceived themselves as having 'good' to 'excellent' oral health (Table 3).

Table 3 Overall description of health.

	Excellent % (n)	Very good % (n)	Good % (n)	Fair % (n)	Poor % (n)
Regular	89.19 (33)	88.28 (128)	77.92 (187)	52.63 (80)	28.30 (15)
Irregular	5.41 (2)	3.45 (5)	4.58 (11)	9.21 (14)	24.53 (13)
New patients	5.41 (2)	8.28 (12)	17.50 (42)	38.16 (57)	47.17 (25)
All	37	145	240	152	53
P value	0.000	0.000	0.000	0.000	0.096

Table 4 Toothloss characteristics.

	Edentulous % (n)	1-21 teeth % (n)	>21 teeth % (n)
Regular	100.00 (2)	84.42 (62)	75.35 (321)
Irregular	0.00 (0)	0.00 (0)	5.40 (23)
New patients	0.00 (0)	15.58 (12)	19.25 (82)
All	2	77	426
P value	not relevant	0.000	0.000

Table 6 Frequency of patients by SOHSI variables and disease activity.

Table 6a) Frequency of patients by SOHSI variables.

	Ability to eat Q10 % (n)	Ability to speak Q11 % (n)	Ability to socialise		
			Discontent Q5 % (n)	Worried Q6 % (n)	Satisfied Q7 % (n)
Regular	74.00 (333)	72.02 (399)	60.49 (211)	70.24 (446)	82.58 (327)
Irregular	6.67 (30)	6.32 (35)	9.46 (33)	7.09 (45)	3.54 (14)
New patients	19.33 (87)	21.66 (120)	30.09 (105)	22.68 (144)	13.89 (55)
All	(643) 450	554	349	635	396
P value	0.000	0.000	0.000	0.000	0.096

Table 6b) Frequency of patients by disease activity.

	Discomfort Q1 % (n)	Other symptoms Q3 % (n)	Disease status		
			General well being Q9 % (n)	Healthy overall code % (n)	Active disease 2 and 3 overall code % (n)
Regular	57.09 (169)	64.39 (273)	74.66 (387)	90.08 (218) 62.65	(161)
Irregular	11.49 (34)	8.73 (37)	6.00 (31)	2.89 (7)	6.23 (16)
New patients	31.42 (93)	26.89 (114)	19.34 (100)	7.02 (17)	31.13 (80)
All	296	424	517	242	257
P value	0.000	0.000	0.000	0.000	0.000

Tooth loss characteristics

In terms of tooth loss there were no significant differences between the three groups when analysed by 'edentulousness', '1-20 teeth' and '20+ teeth' (Table 4). No statistical significance could be established for the distribution of edentulousness based on patterns of attendance as the group included only two patients both of whom were regular attendees. There was a significant difference between the irregular group compared with the regular attendees with respect to mean number of teeth present (Table 5). There were no significant differences between new patients and either of the regular or irregular patients.

Measures of oral health established from the SOHSI which are highlighted in the Oral Health Strategy Definition of Oral Health.

Overall Impacts

- Ability to eat – 30% inability
- Ability to speak – 13.2% inability
- Ability to socialise: (i) Discontent – 54.7%
(ii) Worry – 98.7%
(iii) Dissatisfaction – 38.4%
- Discomfort: (i) Pain – 46%
(ii) Other symptoms – 66.6%
- General Well-being – 12.9% unwell

Internal Reliability Scores (Cronbach's alpha)

- Ability to speak – 0.89.
- Discontent – 0.78.
- Worry – 0.79.
- Satisfaction – 0.72.

Table 5 Summary of tooth counts in attendance groups

	Regular Mean	SD	95%CI
Number of teeth	25.34	5.45	24.79, 25.88
P value		0.05	
	Irregular Mean	SD	95%CI
Number of teeth	27.69	2.65	26.55, 28.84
P value		0.05	
	New Patient Mean	SD	95%CI
Number of teeth	26.29	4.08	25.45, 27.12
P value		0.05	

Table 7 Severity of pain experience (question 2).

	No % (n)	Mild % (n)	Moderate % (n)	Severe % (n)
Regular	82.02 (219)	66.06 (109)	51.81 (43)	33.33 (16)
Irregular	2.25 (6)	9.09 (15)	13.25 (11)	16.67 (8)
New Patients	15.73 (42)	24.85 (41)	34.94 (29)	50.00 (24)
All	267	165	83	48
P value	0.000	0.000	0.000	0.000

Table 8 Severity of other symptoms experience (question 4).

	Lot % (n)	Little % (n)	None % (n)
Regular	49.18 (30)	65.18 (146)	81.54 (159)
Irregular	13.11 (8)	10.71 (24)	3.08 (6)
New Patients	37.70 (23)	24.11 (54)	15.38 (30)
All	61	224	195
P value	0.000	0.000	0.000

Table 9 SOHSI variables dependence on attendance mode.

Symptom	Significance of dependence on patterns of attendance	Regular patients with satisfactory symptom (% overall)
Ability to eat	0.006	52.19
Ability to speak	0.041	62.54
Ability to socialise:		
Discontent	0.000	37.30
Worry	(0.53)	64.73
Satisfaction	0.000	51.25
Discomfort	0.000	43.8
Other Symptoms	0.000	27.43
General Well being	0.000	60.50
Disease Status	0.000	43.69
Severity of Pain	0.000	38.9
Severity of other symptoms	0.000	11.25
Overall description of health	0.000	68.38 (at least fair)

Table 6 shows the frequency of patients by SOHSI variables and disease activity. The severity of discomfort experienced by patients is shown in Tables 7 and 8. All SOHSI variables dependence on different modes of attendance at a dental surgery were confirmed significant with a high proportion of patients with satisfactory symptoms being regular attendees (Table 9). It is worth noting that the highest percentage (64.73%) referred to the regular patients who were worried about their dental health. Out of the total sample, only three patients had no worries who were all regular attendees. The independence test for that factor was insignificant but unreliable as more than one cell had an expected value of less than five.

DISCUSSION

This study has investigated oral ill health and regularity of dental care in one general dental practice in South Wales. The definition of regular attendance was based on the registration interval for adults within the UK General Dental Services contract at the time of planning this survey – two years. There are significantly more regular patients attending this dental location compared with patients attending irregularly. The SOHSI has been shown to have good characteristics in term of generalisability, efficiency, reliability and validity.¹⁸

Sociodemographic variables show younger individuals to be more irregular in their attendance patterns with significantly more individuals from deprived areas presenting as new patients. It could be that these patients were from a background of casual symptomatic dental attendance.

The clinical measure showed regular attenders to have fewer teeth than irregular attenders. Other reports have documented similar findings with regard to tooth loss.¹⁹ This could be interpreted that irregular attenders have better dental health than regular attenders. We should be mindful of the fact that the measure is somewhat crude as a clinical indicator of oral health and although differences appear, whether these differences are clinically significant is questionable. It could be that individuals who go to the dentist regularly, prior to symptoms, actually do suffer fewer symptoms from the progression of dental disease by having planned extractions and care.

The patients studied did report oral disorders and conditions which affected their lives. The proportion of patients expressing oral problems was similar to those reported in other studies of similar age cohorts.²⁰ It was anticipated that the prevalence and severity of social and psychological impact would be lower in individuals who attended for regular dental care. This outcome was as marked as expected with seven of the eight indicators included in the SOHSI showing significant differences, the eighth being insignificant but unreliable. Also the dentists' opinion of individuals with active disease showed significant differences.

The association between attendance and improved oral health has been widely documented.^{6,21–24} These results support this association. In the population at large, social class differences for oral health are recognised. In view of the fact that those in higher socioeconomic groups are more likely to register with a dentist and are more likely to attend for check ups when they do not have symptoms,²⁵ these results could just be reflecting social class differences.

If this were the case, similar differences in the prevalence and severity of social psychological impact would be expected for deprivation status. Differences were present but in only three of the eight SOHSI variables when the data was analysed by deprivation status.²⁶

Historical literature surrounding dental attendance may provide some explanations for these results. Dental disease activity is, for the majority of individuals, dependant on their behaviours with regard to brushing and diet.⁴ In view of population disease experience Sheiham in 1977 questioned the effectiveness of routine six monthly examinations to improve oral health, based on epidemiological data.²⁷ As preventive dentistry evolved, Elderton in 1985 suggested that six monthly examinations were only advisable if the dentist adopted a preventive approach to care.^{28,29} At this time philosophies based on a non-invasive 'watch and wait' principle were considered appropriate. In 1997 Kay and Locker³⁰ concluded, from a systematic review on the effectiveness of oral health promotion, that individualised advice from dental staff on a regular and repetitive basis was one of the most effective ways of ensuring patients complied with preventive behaviours. The interval between check-ups has been reported as 12 – 18 months,²⁷ more recent reports state 13 – 120 months.³¹ It is now considered that the dentist is the best person to decide on the interval between attendance, based on individual assessment of disease activity and risk.⁷ Effective preventive care will result in low risk, disease inactive patients whose recall need will be less frequent.

These results, although only from one case study of one general dental practice, pose some important questions regarding patient registration and attendance. Quoting from *Modernising NHS Dentistry*² (p16, 3.4) 'What really matters is that everyone can get NHS dental care when they need it, not that everyone is registered'. Those with greatest need are the socially disadvantaged. If dentists are to have an impact on improving oral health for this client group then the first step is patient registration. This allows the dentist to psychologically 'contract' with the patient for continuing care, an important element of any behaviour management programme. The dentist then needs time to influ-

ence any behaviour change through a registration period. Significant differences were observed on all of the eight impacts of the SOHSI between those attending regularly (at least every two years) and irregularly. The registration period is now 15 months and the individuals who will maintain their registration status are likely to be those from socially advantaged groups who are likely to be low-risk individuals with least need for care. When patients are reminded of the fact that their registration is about to terminate, many are 'forced' to attend for a check-up to maintain their registration status even though they and the practitioners would be happy to leave the check-up for a two year period. This seems to show an NHS system which is encouraging the use of services based on 'treatment' and not the maintenance and promotion of health. If oral health inequalities are to be a priority then services should be based on need. There is a need for registration as an aid to ongoing care in the groups who tend not to use services, namely the lower socio-economic groups. The period of registration should be such that those with least need are not forced to use services (which could be used by those with greatest need) in order to maintain registration.

CONCLUSION

The results of this case study show that there is a significant difference in oral health between regular and irregular attenders. Regular attendance is associated with better oral health. The definition of regular care has been 'a visit within the last two years'. In order to maintain registration, attendance is required every 15 months. Even when the data reflecting the impact of the new policy is not included in this analysis, there is evidence to show that current policy does not contribute towards the development of equitable services.

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Appendix

Please tick the answers which apply to you for each question

(1) Have you had any of the following pains in the last 4 weeks?

- ☐ toothache
 ☐ pain in jaw joint while chewing
 ☐ burning sensation in the mouth
☐ pain in teeth with hot or cold food or fluids
 ☐ pain in joint while opening wide
 ☐ shooting pains in the face/cheek
☐ pain in the teeth with sweet foods
 ☐ pain in the face in front of ear
 ☐ pain or discomfort from denture

(2) In the last month, the worst discomfort you had from your mouth or teeth, would you describe it as:

- ☐ No pain
 ☐ mild
 ☐ moderate
 ☐ severe

(3) Have you had any of the following in the last 4 weeks?

- ☐ sore spots or ulcers
 ☐ difficulty opening mouth wide
 ☐ bad breath
 ☐ broken or chipped tooth
☐ cold sores
 ☐ unpleasant taste
 ☐ bleeding gums
 ☐ loose or poorly fitting denture
☐ clicking or grating jaw joint
 ☐ dry mouth
 ☐ sore gums
 ☐ stain on teeth/denture

(4) Overall, how much have these problems bothered you over the last 4 weeks?

- ☐ A lot
 ☐ a little
 ☐ not at all

(5) In the last 4 weeks

Have you stopped eating foods you enjoy?

Has your enjoyment of food been less than it used to be?

Have you had to eat slower because of teeth/mouth/denture problems?

Have you avoided eating with other people because of problems chewing?

Have you felt embarrassed about the look of your teeth?

Have you avoided laughing or smiling?

Have you avoided conversations with others?

Never	Sometime	Fairly often	Very often	All the time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(6) In the last four weeks how much did you worry about the appearance of your teeth or mouth?

Never ☐ sometimes ☐ fairly often ☐ very often ☐ all the time ☐

And how much did you worry about the health of your teeth or mouth?

Never ☐ sometimes ☐ fairly often ☐ very often ☐ all the time ☐

(7) In the last 4 weeks were you satisfied with:

The appearance of your teeth and/or dentures?

Your ability to chew food?

Your ability to speak?

very satisfied	satisfied	dissatisfied	very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(8) Overall how would you describe your dental health?

- ☐ Excellent
 ☐ very good
 ☐ good
 ☐ fair
 ☐ poor

(9) In the last month have problems in your mouth caused you to:

Take time off work

Stay at home more than usual

Stay in bed more than usual

Yes

No

have difficulty in sleeping

be unable to do your usual leisure activities

be unable to do household jobs

Yes

No

☐☐☐☐☐☐☐☐☐☐☐☐

(10) In the last four weeks have you had problems chewing these foods?

Fresh carrot or celery sticks?

Fresh lettuce or spinach salad

Steak, chops or firm meat?

Yes

No

Boiled peas, carrots or green or yellow beans?

A whole fresh apple without cutting?

Yes

No

☐☐☐☐☐☐☐☐☐☐

(11) Do you ever have difficulty speaking clearly/pronouncing words because of problems with your mouth?

Never ☐ sometimes ☐ fairly often ☐ very often ☐ all the time ☐

Do you ever have difficulty making yourself understood because of problems with your mouth?

Never ☐ sometimes ☐ fairly often ☐ very often ☐ all the time ☐